Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Commission's Rule	)	
Regarding the Pricing of Unbundled	)	
Network Elements and the	)	WC Docket No. 03-173
Resale of Service by Incumbent	)	
Local Exchange Carriers	)	

DECLARATION OF DR. AUGUST H. ANKUM REGARDING SWITCHING DISCOUNTS AND NON-RECURRING COSTS ON BEHALF OF MCI

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Attachments

I. INTRODUCTION

A. Personal Qualifications

My name is Dr. August H. Ankum. I am a Senior Vice President at QSI Consulting, Inc., a consulting firm specializing in economics and telecommunications issues. My business address is 1261 North Paulina, Suite #8, Chicago, IL 60622.

I received a Ph.D. in Economics from the University of Texas at Austin in 1992, an M.A. in Economics from the University of Texas at Austin in 1987, and a B.A. in Economics from Quincy College, Illinois, in 1982.

My professional background covers work experiences in private industry and at state regulatory agencies. As a consultant, I have worked with large companies, such as AT&T, AT&T Wireless and MCI WorldCom ("MCIW"), as well as with smaller carriers, including a variety of competitive local exchange carriers ("CLECs") and wireless carriers. I have worked on many of cost proceedings and arbitration between new entrants and incumbent local exchange carriers ("ILECs"). Specifically, I have been involved in cost proceedings and arbitrations between new entrants and ILECs in New York, New Jersey, Massachusetts, Pennsylvania, Vermont, California, Florida, Georgia, Texas, Missouri, Illinois, Indiana, Michigan, Wisconsin, Ohio, Minnesota, Utah, New Mexico, and in many other states and in the Common Wealth of Puerto Rico. I have also assisted public agencies, such the Office of Public Utility Counsel of Texas and the New Mexico Public Utility Regulatory Commission.

Prior to practicing as a telecommunications consultant, I worked for MCI Telecommunications Corporation ("MCI") as a senior economist. At MCI, I provided expert witness testimony and conducted economic analyses for internal purposes. Before I joined MCI in early 1995, I worked for Teleport Communications Group, Inc. ("TCG"), as a Manager in the Regulatory and External Affairs Division. In this capacity, I testified on behalf of TCG in proceedings concerning local exchange competition issues, such as Ameritech's Customer First proceeding in Illinois. From 1986 until early 1994, I was employed as an economist by the Public Utility Commission of Texas ("PUCT") where I worked on a variety of electric power and telecommunications issues. During my last year at the PUCT, I held the position of chief economist. Prior to joining the PUCT, I taught undergraduate courses in economics as an Assistant Instructor at the University of Texas from 1984 to 1986.

Of particular importance to the current proceeding is my extensive background in and experience with the ILECs cost models filed in TELRIC proceedings. A list of proceedings in which I have filed testimony is attached hereto as Attachment I.

B. Purpose of Testimony

The purpose of this testimony is to comment on the questions raised by the FCC on switching issues and non-recurring issues. Specifically, this testimony addresses the questions raised on switch discounts, paragraphs 76 through 81, on switching rate structure, paragraphs 131 and 132, and on non-recurring costs issues, paragraphs 114 - 130.

Other switching related issues raised by the FCC under section B.1., General Theory, and elsewhere in the NPRM, are addressed in the testimony of Dr. Michael Pelcovits filed on behalf of MCI. The answers provided in this testimony assume that a forward-looking total cost methodology is adopted and provide specific recommendations as to switching and non-recurring cost studies within that context.

II. SWITCH DISCOUNTS: PARAGRAPHS 76 - 81

A. Introduction

In general, the best evidence of the cost of switching is the actual recent contracts of the ILECs with switch vendors. A determination of the switch vendor discounts therefore should be consistent with the specifics of the switch vendor contracts of the ILEC in question. In fact, the very phrase of switch discounts is in some jurisdictions a misnomer since for some companies the switch vendor contracts do not contain the discounts for new and growth facilities envisioned by the NPRM. That is, some switch vendor contracts will simply have a bifurcated pricing structure with the new prices for switch facilities being lower than the growth prices. Further, the "discounts" offered the ILECs are not relevant in and of themselves: what is relevant is the total amount the ILECs pay for their switches.

This section will recommend adopting a method for determining switch investments (and accounting for vendor discounts) that is generally similar to the method adopted by the FCC's Wireline Competition Bureau in the AT&T/WorldCom and

Verizon arbitration in Virginia,[1] with the notable exception of the recommended treatment of switch hardware and software upgrade costs.

Again, it is the terms and conditions found in the ILECs' switch vendor contracts that ought to dictate – consistent with the cost causation principle in TELRIC – how the costs of switching facilities are to be determined in TELRIC studies. For example, if the contracts do not contain costs for the getting started portion of the switch that is traditionally identified in the SCIS model (which is referenced in the *Virginia Order*) then cost studies should not artificially contrive the existence of getting started investments and costs.

B. Paragraph 78

In paragraph 78, the FCC raises a number of questions. While these questions are all related, as they explore the overall issue raised in paragraph 78 – how to determine switch vendor discounts – they will be answered separately, though within the context of paragraph 78.

1. Should Discounts Be Calculated Over the Life of the Switch?

The first question asked by the FCC in paragraph 78 is the following:

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[1] Memorandum Opinion and Order, CC Docket Nos. 00-218, 00251, *In the Matter of Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration, In the Matter of Petition of AT&T Communications of Virginia Inc., Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia Corporation Commission Regarding Interconnection Disputes With Verizon Virginia Inc.*, released August 29, 2003. Hereinafter referred to as the *"Virginia Order."* See paragraphs 381 through 417.

> We seek comment on whether unbundled switching costs should be based on the prices that an efficient incumbent LEC or other entrant would pay for switching equipment over the life of the switch and not at a particular point in the switch's life cycle, *e.g.*, not at the beginning of the life cycle when the carrier is paying vendors for a new switch, nor at the end of the switch's life when a carrier is paying vendors primarily for growth additions or technology upgrades to the switch.

In general, switching costs should be based on the prices that would be paid for switching equipment installed over the life of the switch. Given the generally bifurcated pricing structure of switch vendor contracts, with new prices that are low and growth prices that are high, switch costs should reflect the proper relative percentage of facilities placed at new prices versus the percentage of facilities placed at growth prices over the life of the switch.

The relative percentage of facilities placed at growth prices should be calculated based on the expected growth rate for the facilities (lines and trunks, see discussion below). In a general sense, the higher the expected growth rate for lines and trunks, the larger will be the relatively percentage of facilities to be valued at growth prices. Further, the relative weighting should account for the time value of money by discounting to the present period the quantities of facilities placed at growth prices. The discount rate should be the approved cost-of-capital for the ILEC. The relative percentage of facilities placed at new prices is then to be calculated as the residual: i.e., 100 % minus the percentage of facilities placed at growth prices.

This method of determining the relative weighting of new and growth facilities is illustrated by the table below. The inputs into this methodology are the economic life of the switch, the cost of capital and the expected rate of growth. For purposes of illustration only, they are assumed to be respectively: 5 years, 10%, and 1%. The results are as follows:

Years	Growth Rate	Base 100	Annual Growth Lines	NPV Line Growth	Cumulative Growth
1	1.00%	101.00	1.00	0.91	0.91
2	1.00%	102.01	1.01	0.83	1.74
3	1.00%	103.03	1.02	0.77	2.51
4	1.00%	104.06	1.03	0.70	3.21
5	1.00%	105.10	1.04	0.65	3.86

Thus, given this methodology, the weighting of facilities bought at new prices versus at growth prices should be 96.28% and 3.72%, respectively.[2]

This method is in essence the same as the one adopted by the FCC's Wireline Competition Bureau in the *Virginia Order*.[3] The fact that the FCC found that the non-scalable portion of the switch, the getting started equipment, should for 100% be priced at

[2] This is calculated as: 3.72% = 3.86/(100 + 3.86), and 96.28% = 100% - 3.72%.

[3] See paragraphs 381 through 417.

the new prices does not change the validity of the observation. To see that the method is still the same, one only has to recognize that the growth rate for non-scalable equipment is, by definition, zero, which means that the method generates a result of 100% new prices for non-scalable portion of the switch (the getting started equipment).

Thus, while the switch vendor contracts may differ in structure from ILEC to ILEC, the method recommended above – and the method adopted by the FCC in the *Virginia Order* – is the appropriate method. It can be applied under various switch vendor pricing structures to generate a result that appropriately quantifies the total switch investment of the ILEC consistent with the assumptions underlying the TELRIC methodology.

By contrast, the approaches advocated by some of the ILECs would result in switching costs that would decidedly not reflect the costs of a forward-looking, efficient switching network capable of accommodating total demand. Given the bifurcated pricing structure typically found in the switch vendor contracts, basing switching costs on either the generally lower new prices or on the generally higher growth prices would cause the total switch investments to be understated or overstated, respectively. Only a method that accounts for both the new prices and the growth prices, as detailed above, would be able to accurately reflect the total costs of the switching network. Again, this method can be applied to the various pricing structures found in the switch vendor contracts.

2. Switch Access Line Growth

Next, in paragraph 78, the FCC also asked about: "Is it reasonable to assume that switch access line demand will grow?" With respect to this question, the following may be noted.

First, as will be discussed in more detail below (with respect to the FCC's questions on switching rate structure, paragraphs 131 and 132.), under most switch vendor contracts line demand will be the relevant cost driver and not usage.

Of course, while at negative growth rates, the recommended method generates a result of 100% new prices for all switch facilities, this result is still the correct answer. To the extent that this means that at the end of the switches' life cycle, there may be underutilized switch capacity (as customer or service attrition leave underutilized facilities), this should have no bearing on the question of what the total switch investment is since the effect of spare capacity is adequately captured in the cost studies by adjusting fill factors. Further, whatever level of spare capacity may emerge at the end of the switches' life cycle, it should be discounted to the present period at the cost of capital and, as such, would probably have only a small and possibly negligible effect on overall fill, or rate of utilization, which should always be very high for digital switches given that switches are generally purchased on a per-line and per-trunk basis.

3. Technological Improvements

The FCC also asked "Is it reasonable to assume continued improvement in switch technology?" A number of observations are in order.

First, this issue is closely related to the issue of switch upgrades, which is discussed in more detail below in response to the FCC's questions raised on upgrade costs in paragraph 80.

Further, to the extent the question concerns not switch upgrades but the introduction of new switch technologies to replace existing ones, the effects of introducing such new technologies on switch costs should be captured in adjusting assumptions about the economic life of the digital switch.

Third, to the extent that newer technologies translate into lower prices per unit of demand, the effects will be captured in subsequent proceedings as, over time, commissions continue to investigate the validity of UNE prices. This issue is, again, closely related to the issue of switch upgrades, which is discussed in more detail below in response to the FCC's questions raised on upgrade costs in paragraph 80.

Last, while newer technologies may increase the quality of telecommunications services, this in itself has no bearing on the question of switch discounts and total switch investments.

In any event, none of the considerations regarding this issue should significantly alter the conclusion that the method recommended above (and adopted by the FCC in the *Virginia Order*) is appropriate under the TELRIC methodology.

4. State Commission Findings on Discounts

In paragraph 78, the FCC also asks: "What assumptions have state commissions made with respect to switch vendor discounts?"

The aforementioned method for calculating the switch discounts has either been implicitly or explicitly adopted by a large number of commissions. In the former Ameritech states, the method has implicitly been adopted in Illinois, Indiana, Wisconsin and Michigan. Further, since the method aforementioned has been used by Qwest in its cost studies, many state commissions in the Qwest states have either implicitly or explicitly adopted this method as well. Last, there is a number of states in the Verizon region that have also adopted this method.

5. Vendor Pricing Strategies

In paragraph 78, the FCC raises the question: "Parties also should explain their assumptions regarding vendor pricing strategies, and the basis for those assumptions."

First, it should be noted that the differential between the low new prices and the high growth prices is reasonably explained by simple economies of scale. The placements of new switch facilities have typically involved situations in which large volumes of lines and trunks are installed. This is certainly true for situations in which the new digital switches replaced older generations of analog switches. Those analog switches, such as the Lucent 1A switches, were mature switches that served large numbers of customers. The new digital replacement switch facilities, therefore, would be installed with large numbers of lines and trunks and the cost of installation would naturally reflect enormous economies of scale. By contrast, the installation of growth

facilities may happen piecemeal and concern only 500 to 1000 lines, and a corresponding number of trunks, at a time.[4] Naturally, given that most of the vendor prices are engineered, furnished and installed ("EF&I) prices, the economies of scale of production (for the switch vendors) and the economies of scale in installation adequately explains the differential between new prices and growth prices.

The issue of vendor pricing strategies, however, is frequently raised by ILECs as an argument for why switch costs should not be based entirely or predominantly on new or replacement prices. The arguments lack merit.

One of the arguments often presented asserts that the "low" new switch prices are below cost and intended as loss leaders. Further the "low" new prices, it is then argued, are made possible only in view of the "higher" prices for growth facilities through which the upfront losses are to be recouped. There is no evidence for these assertions.

First, the switch vendors are typically not part of the state proceedings and no evidence is presented on their part that could demonstrate that the new prices are below cost. Further, the proposition that new prices are set below cost by the switch vendors is simply not credible given that *most* of the switch facilities have historically been placed at new prices.[5] Indeed, the high degree of uncertainty regarding customer line growth, the level of competition among switch vendors, and the pace of technological advancements, would make it a very risky strategy to sell such large volumes of facilities

[4] The minimum order quantities will vary from switch vendor to switch vendors. The smallest minimum order quantity on a per switch basis may be as low as 512 lines.
[5] As noted, most digital switches were placed as replacement switches for fully mature analog switches. Thus, most digital switches facilities were placed as new facilities at cutover in order to accommodate the large volumes of customers previously served by the analog switches.

at below cost prices.[6] Further, given the high pressure on companies to produce profits in the short run, it is hard to imagine a CEO that would be willing to incur significant losses in the short run in the hopes that larger profits – that will be heavily discounted by financial markets – at some point, possibly over a decade, in the future.[7] Last, if the new lines were to be sold below cost, then one would expect to find provisions in the switch vendor contracts that limit the number of lines and trunks that companies would be permitted to purchase at those below cost prices. However, no such provisions have been demonstrated to exist. In fact, most commonly, the switch vendor contracts will have provisions to the opposite effect. That is, they will include minimum commitment provisions for new switch facilities below which the ILEC may not fall. These types of provisions are clearly at odds with any claims that the new prices are set below cost.

Another argument often heard is that the negotiations between the ILEC and the switch vendors entails a perceived "unit price" by the switch vendors. This unit price reflects a weighting of lines and trunks on new switches and growth lines and trunks on existing switches. Because the perceived unit price in the negotiations reflects the switch vendor's opinion about the switch purchases *over the contract period*, certain ILECs argue that switch discounts should be calculated based on the projected switch purchases over the contract period and not be calculated over the full economic life of the switch, as the FCC found in the *Virginia Order* and as recommended in these comments. A

[6] The example often given is that of the book club with the low introductory prices. Clearly, the book club can risk the loss leader approach because it involves only a small number of books upfront that are sold at a loss. However, if the ratio books sold upfront at a loss relative to those sold subsequently at full prices resembled that experienced by the switch vendors, it is doubtful that book clubs would continue this practice.

[7] If new switch facilities were sold below cost, as claimed by some ILECs, it would surely take over a decade to recoup those losses in full given that most of the facilities are placed as new facilities.

corollary conclusion to this argument is that switch vendors would not be willing to replace most of the existing network at the new prices in the contracts.[8] The "unit price" arguments lacks merit for many of the same reasons as cited previously. Again, there is no demonstration that the new switch prices are set below costs and thus there is no reason why the switch vendors would not be willing to sell any number of facilities at those prices as long as the conditions provide for sufficient economies of scale to warrant the low prices. Next, the notion of the "unit price" implied in the negotiations between ILECs and vendors would only be valid if the cost of placing new facilities and the cost of placing growth facilities were the same. Again, because of the inherent economies of scale in placing new facilities, this is simply not the case. Further, for vendors to be able to target a "unit price" that weights new and growth prices by their relative anticipated quantities, the vendor would need commitments on growth facilities from the ILECs. It has not been demonstrated in regulatory proceedings that the switch vendor contracts contain such commitments for growth facilities. Nor has it been demonstrated that during the negotiations between switch vendors and ILECs that it is communicated to the vendors how many growth facilities are likely to be purchased. Last, as noted, the "unit price" theory would have to carefully balance the quantity of new switch facilities against the projected quantities of growth facilities. Certainly, if the new prices were set below costs it would be of utmost importance to limit the number of new facilities that could be bought at those below cost prices: typically, no such provisions are negotiated. In short, the theory that switch vendors target a "unit price," *which ILECs argue precludes the*

[8] For example, Ameritech made this argument in Wisconsin and in Michigan, and those arguments were correctly rejected by the relevant commissions.

purchase of a large number of switches under the low new prices, is at odds with a large number of facts. As such, it must be rejected.

In the end, however, so long as all costs, those of the initial switch purchases and of the growth facilities, incurred over the useful life of the switch are appropriately reflected in the studies, it is of no great consequence whether the price for new switch facilities is discounted and the price of the growth facilities are possibly higher, in part, to provide vendors with additional profits. Whether that be true or not, under the method recommended in these comments, the ILEC will recover all of its switch costs.

C. Paragraph 79

1. How to Determine Total Switch Investments with New and Growth Switch Facilities Prices?

In paragraph 79, the FCC is asking comments on how to determine per unit costs in the presence of the bifurcated pricing structure often found in the switch vendor contracts. Specifically, the FCC asks:

> In the case of switching, does the total cost consist of a new switch reflecting a relatively large vendor discount plus growth and upgrade equipment reflecting relatively small discounts?

This question in essence the same as the one raised in paragraph 78, which has been addressed extensively in previous sections of these comments. In principle, as discussed previously, the answer is yes.

2. How to Determine Unit Investments/Costs?

Next, the FCC raises the issue of what quantity to use in the denominator after switch discounts and switch investments have been determined: "Should this cost then be spread over total demand consisting of all the lines served by the new, growth, and upgraded equipment over the switch's life?"

The answer is: yes, the per unit investment figure(s) should be determined by spreading total investment "over total demand consisting of all the lines served by the new, growth, [...] upgraded equipment over the switch's life." First, this method is consistent with the language found in paragraph 682 of the FCC's Local Competition Order on the TELRIC methodology:

> Per-unit costs shall be derived from total costs using reasonably accurate "fill factors" (estimates of the proportion of a facility that will be "filled" with network usage); that is, the per-unit costs associated with a particular element must be derived by dividing the total cost associated with the element by a reasonable projection of the actual total usage of the element.

A "reasonable projection of actual total usage" in the switching context would be the discounted demand over the economic life of the switch.

Further, this method of calculating unit demand, in conjunction with other cost study requirement, would result in a measure of efficient, forward-looking average/per unit costs. For reasons explained elsewhere in the MCI comments, UNE prices are economically efficient prices when they are set at efficient, forward-looking average costs.

Next, once per unit investment figure(s) – for such switch components as line ports, trunk ports, feature costs – have been determined, the unit investments can be used in downstream studies to determine UNE switching costs. These downstream studies would apply the annual charge factors, etc., necessary to convert the unit investment figures into recurring expenses streams.

The FCC also asks for comments on the role of the time value of money in these calculations:

> We ask for comment on the use of this principle in developing a price that is based on costs of equipment installed in increments over the life of the switch. Parties also should explain whether, and how, these calculations should account for the time value of money.

The method recommended in these comments and adopted in the *Virginia Order*, accounts for the fact that facilities are placed over time. It does so by discounting to the present period (the time period at which the switch is placed) those facilities that are placed over time as demand emerges. Arithmetically, this is accomplished by discounting the demand figures. The discounted demand figures then form the weights applied against the new and the growth prices to determine the per unit investment. The method described here is illustrated numerically in the next section.

3. Illustration of UNE Analog Line Port Cost Calculation

The above discussion is easily illustrated by means of a numeric example. Using the results of the previous example provide in response to paragraph 78, in which the relative weights for determining the switch vendor discounts/prices were determined to

be 96.28% and 3.72% for new and growth prices, a per-line port unit investment is calculated as follows:

	Analog Line price[9]	Weight	Weighted Unit Price
New price	$ 50.00	96.28%	$ 48.14
Growth price	$ 70.00	3.72%	$ 2.60
Unit price/investment			**$ 50.74**

In this example, it is recognized that the growth facilities are placed over time to accommodate demand growth. The growth facilities are discounted to the present period. Further, this method, as discussed, is consistent with TELRIC in that it accounts for total demand, in terms of new and growth facilities, over the life of the switch.[10]

This method is easily expanded to account for the presence of various switch vendors in the network by replicating the same exercise and by weighting the unit investments by the technology mix (the relative percentage of, say, Lucent, Nortel, and/or Siemens switches). Further, this method is also easily expanded to account for various different switch facilities, other than line ports.

Once the per unit price/investment has been calculated, switching related UNE costs are easily calculated by multiplying the per unit price/investment times the ACFs to

[9] The per-line switch vendor prices are hypothetical and not intended to represent actual prices as they would be found in switch vendor contracts.

[10] For purposes of this discussion, the terms "switch demand" and "line ports" are used interchangeably. As will be discussed below in response to issue raised in paragraph 131 and 132, increasingly switch vendor contracts are expressed on a per-line port basis, which makes it possible to express switch demand growth in terms of line ports that are purchased to accommodate demand.

convert the investments into recurring cost streams. For example, the monthly recurring cost for a UNE analog line port is then calculated as follows:[11]

1	Unit Investment Analog Port	$50.74	*As calculated above*
2	ACF (377C - Digital Switch)	25.00%	*Composite ACF*[12]
3	Annual Costs	$12.69	*Ln 1 x Ln 2*
4	Basic Analog Port - Monthly Costs	$1.06	*Ln 3 / 12*
5	MDF related costs	$0.05	
6	Intercepts Required	$0.01	
7	Feature costs	$0.50	
8	**Monthly UNE Line Port Costs**	**$1.62**	*Sum Ln 4 – Ln 7*

In this particular example, the Unit Investment Analog Port figure is based on the per-line port costs/price as found in the switch vendor contracts and would (depending on how the contracts are structured, as discussed in paragraphs 131 and 132) represent a *flat-rated switching element* analogous to that adopted by the FCC in the *Virginia Order*, and in many other states, such as Illinois, Michigan, Wisconsin, Indiana, Minnesota and Utah.

This example illustrates how the method recommended for calculating the switch vendor discounts/prices in these comments calculate UNE switch costs over total demand (new and growth) over the economic life of the switch, and how the growth facilities are

[11] All figures are hypothetical and not intended to represent actual costs for these facilities and services as experienced by any one ILEC.
[12] The ACF would account for taxes, telco engineering, building and land expenses, depreciation, cost of money, maintenance, etc.

discounted to the present period using the cost of capital as the discount rate to reflect the time value of money.

As to the FCC's question of: "Is the appropriate discount rate the cost of capital used in calculating UNE prices generally?," the answer is: yes, since it represents the time value of money for the ILEC.

The FCC also asked about the treatment of upgrade costs. That issue is discussed below in response to the FCC's questions raised in paragraph 80.

D. Paragraph 80

1. Should the Staring Point Be a Newly Installed Switch?

In paragraph 80, the FCC asks about the appropriate starting point for calculating switch costs: "we seek comment on whether the starting point for calculating costs should be a new switch that is installed today." In a general sense, the answer to that question would be: yes. However, given the method for calculating switch discounts and switch investments recommended in these comments, and as adopted by the FCC in the *Virginia Order*, it is not clear that the phrase "installed today" affects the arithmetic of the calculations. The inputs into the calculations discussed previously are: switch vendor prices, economic life of the switch, cost of capital and expected growth rates. Given particular values for these four sets of inputs, the results of the switch cost calculations will be very much the same, irrespective of whether it is assumed that a switch was placed five years ago or today.

2. Should Upgrade Costs Be Included?

The FCC also seeks comment on whether switch costs should reflect "in addition to costs for the initial switch equipment, costs of growth additions and technology upgrades, growth additions alone, or upgrades alone for the years following the initial installation.

As discussed previously (see comments in response to paragraphs 78 and 79), these comments recommend that switch costs reflect the initial/new switch facilities and the growth facilities over the economic life of the switch. This answer, that growth facilities should be included in the cost calculations, assumes that the term "growth facilities" refers to switch facilities needed to accommodate growth in the number of customer lines that terminate on the switch. It is not appropriate, however, to include the costs of switch upgrades in the switch cost calculations.

Switch upgrades should be excluded from the switch cost calculations for the following reasons. First, switch upgrades, such as processor upgrades or software upgrades, are typically purchased and installed for older switches. Moreover, these older switches are most likely to have been placed under older generation contracts that provided for different terms and conditions than the current contracts. As such, including the cost of switch upgrades for older switches that have been purchased under expired switch vendor contracts is a mixing of technologies – embedded with current/forward-looking technologies – that will not yield an accurate result, and, as discussed below, will also be a departure from the sensible TELRIC-simplifying principle that costs be measured based on the most currently available technology.

Second, the switch upgrades, such as processor and software upgrades, would typically be provided without additional charges as part of the current switch vendor prices when new facilities are purchased. That is, the costs of the state-of-the-art processors and software are already reflected in the current switch vendor prices. Given that the cost studies will be based on the current switch vendor prices (for new and growth facilities) the cost studies will automatically include costs for whatever processors and switch software are state-of-the art. To also include upgrade costs for these very same facilities would result in a simple and straightforward double counting of those costs.

Third, the argument that the switch will require upgrades over its economic life and, therefore, that those upgrade costs should be included in the forward-looking switch costs is incorrect. Under TELRIC, technology is assumed to be constant. This means that while the system may grow in terms of the number of customers, it should be assumed to be in steady state as far as technological change is concerned. This means that – as a matter of cost study assumptions – there will not be any switch upgrades. To the extent that in the real world technological changes will be introduced and switches will be upgraded, the costs associated with those technological changes will be reflected in new switch vendor contracts, which are typically renegotiated precisely to reflect technological changes. Thus, whatever technological changes and associated costs the ILEC may experience, those changes and costs will be accounted for when the updated switch vendor contracts are used in a subsequent round of TELRIC proceedings. As

such, the rolling process of periodic TELRIC proceedings that each time consider updated, new switch vendor contracts ensure that the ILECs are continuously able to recoup the costs of new technologies (switch upgrades as reflected in the new prices of new switch vendor contracts.)

In short, the assumption that the state-of-technology is constant is theoretically correct and ensures the ILEC – over time – full recovery of its switch costs. Further, it also greatly simplifies TELRIC proceedings.

By contrast, if the Commission finds that the state of technology should not be considered constant under TELRIC, then a number of other cost study conventions would need to be altered as well. Most importantly, if the Commission determines that the cost of anticipated future switch upgrades should be included because technology is not assumed constant, then the cost studies would also have to be changed from exclusive reliance on the current switch vendor contracts and current switch technologies to also account for the mix of older technologies (and older contract prices) within the system. The analysis would have to be expanded to allow for price trends that typically are declining for switch technologies. Further, the analysis should allow for the use of anticipated switch technologies, such as soft switches, etc., even though the ILECs may not yet be deploying such newer switch technologies. Current TELRIC assumptions avoid such complexities, and do so without sacrificing the accuracy of the result. While these comments do not recommend that switching studies should be conducted in this manner, these types of speculative considerations would be appropriate if the

Commission decides to relax the assumption that technology is constant and that the cost of anticipated switch upgrades should be included.

Last, the Commission appropriately asks of those that do advocate that switch upgrades be included to "explain why current competitive LECs should pay for benefits that they do not yet receive?" The answer that the Commission is likely to receive in response to this question may read as follows: "CLECs are currently enjoying the benefits of switch upgrades and if the costs of those upgrades are not included in the cost studies, then the ILEC will not receive any compensation for these costs at all." This argument is false. Given that switch costs are to be based on current switch vendor contracts, the cost of the switch upgrades, such as processor upgrades and software upgrades, are reflected in the current switch vendor prices. As such, the ILECs are compensated. Again, to include the costs of these switch upgrades would amount to a straightforward double counting of costs.

3. Should UNE Prices Be Based on Current Vendor Contracts

The FCC asks whether UNE prices should be based on "vendor prices that the incumbent LECs currently pay for equipment they are installing today in existing switches, *i.e.*, vendor prices for growth additions and technology upgrades made at a particular point in the life cycle of an existing switch." For the reasons discussed in the comments above, the answer is: yes. To briefly recapitulate: First, to permit the use of older contracts amounts to using embedded costs and is not forward-looking, nor would it result in prices that send relevant price signals to markets for decisions on self provisioning versus leasing, an issue of increased importance in view of the

Commission's recent *Triennial Review Order*. Second, to not use exclusively the current contracts but to speculate about future contract provisions and technologies would greatly complicate the task of state commissions. It would also open up a debate about alternative switch technologies that have not been generally adopted by the ILECs and other carriers. The resulting prices, again, would not send the proper signals to market entrants on decisions regarding self provisioning versus leasing. Third, it is the structure of the current switch vendor contracts that to a large extent should guide commissions in how costs are incurred and how those costs should be recovered. This issue is discussed in more detail in response to issues raised in paragraph 131 and 132 on switching UNE rate structure. It will be argued that it is the pricing structure in the current switch vendor contracts that warrants the adoption of a monthly recurring flat-rated switching element without additional usage charges. To the extent that older contracts may contain different terms and conditions for purchasing switch facilities, those would likely reflect that switches were bought piece meal, a la carte, as switch growth necessitated switch augmentation. As such, the use of the older contracts would be inconsistent with the cost causation process experienced under the current contracts. Again, this issue is discussed in more detail below.

E. Paragraph 81

1. Cost Studies

In paragraph 81, the FCC asks to illustrate by means of cost studies how the recommendations made in comments filed by parties is implemented in actual cost

studies. It provides specific instructions on how those cost studies should be conducted. These comments have already illustrated, in part, by means of numeric examples how the various recommendations herein are implemented computationally. Attached to these comments are more extensive Excel based examples of switching cost studies that provide the FCC with the information it is seeking.

III. SWITCHING - RATE STRUCTURE: PARAGRAPHS 131 - 132

A. Introduction

In paragraph 132, the FCC asks a number of questions regarding the appropriate rate structure for the local circuit switching element. First, the FCC asks "whether, and under what circumstances, changes are needed to our rate structure requirements. Would it be appropriate to require that switching costs be recovered solely through flat-rated charges?"

In general, the answer is: yes. As noted before in these comments, it is of utmost importance that the UNE prices reflect cost causation. This means that first and foremost, one should examine the switch vendor contracts that contain the terms and conditions under which the ILECs are purchasing their switches. It is the switch vendor contracts that determine primarily how the ILEC incurs its switch costs and, thus, how costs should be recouped from CLECs through UNE prices. Given that the switch vendor contracts increasingly contain a per-line price structure that accommodates virtually all reasonable peak load calling patterns *without variations in per-line prices* it is appropriate to allow states to adopt flat-rated switching charges, as many states have

done. By contrast, to adopt usage-based rates that generate significantly more revenues from high-volume users than from low-volume users while the costs are demonstrably the same for both is inconsistent with cost causation, leads to unjustifiable cross-subsidies, and unreasonably handicaps CLECs from competing for certain groups of customers. Further, usage-based rates inevitably lead to unproductive and unnecessary fights over the "correct" average number of MOUs to use in the studies.

These comments will focus predominantly on the economic question of how switch costs are incurred by the ILECs and in doing so these comments will seek to demonstrate that as a matter of economics, costs do not vary with usage. It is important to distinguish this perspective from the engineering perspective that may found in the comments of other parties. From an engineering perspective it may be possible to argue that a switch serving high-volume customers is engineered differently than a switch that serves low-volume customers. Irrespective of whether this is true, this type of a discussion does not address the question: are the costs different? The point is that even if one were to grant that switches may be engineered differently depending on the types of customers they serve, if the costs don't vary, then the entire engineering discussion is immaterial. To be sure, the fact that switch vendors typically do not charge more for a switch installed in a downtown business district than they do for a switch installed in a rural area (assuming a comparable number of customers lines) means that, as a matter of economics, the UNE costs on a per customer line basis are the same. Under these conditions, the claim that the switches may be engineered differently is immaterial to the cost question.

Further, it should be noted that the usage-based switching rates proposed by most ILECs do not even accomplish their purported objective. Even if there were significant costs associated with switch usage – as claimed by most ILECs – then this observation still in no way justifies their usage-based switching rates. Most calling occurs in off-peak periods,[13] and even the ILECs would concede that off-peak calling generates no costs whatsoever. Yet, under the usage-based proposals of the ILECs, off peak calling would be penalized and discouraged. It is hard to see how this could ever be economically efficient.

What follows is a more detailed discussion of why flat-rated switching is appropriate under the per-line pricing structure commonly found in switch vendor contracts.

B. Discussion of Switch Vendor Contracts

ILECs have traditionally filed UNE switching cost studies and rates that contain a monthly switch port charge and a separate per minute of use charges. (Sometimes feature costs are included in the per-port charges and sometimes they are assessed per individual feature. This issue will be discussed separately below.) This allocation of port costs and usage costs is often represented in terms of traffic sensitive ("TS") costs and non-traffic sensitive ("NTS") costs, with the relative percentage of NTS costs varying from 40 percent NTS to 60 percent NTS. Of course, for high-volume switch users the implication of the per MOU charges is that they are recovering far more of the ILEC's switch costs

[13] Switching studies that use SCIS typically use some measure of how much calling occurs during the peak period. Typically those studies suggest that about 10 percent of all calling occurs at the peak – thus, about *90 percent* may occur in the off-peak periods.

than low-volume users; they are also recovering the ILEC's switch costs on a predominantly usage-sensitive basis, unlike low-volume users. In view of current switch vendor contracts which do not reflect any variations in costs between high and low-volume users, these types if recovery mechanisms and rate proposals are increasingly inappropriate.

Under the newer generation of switch vendor contracts, switches are no longer purchased on an a la carte basis as if the switch were built by the telephone company on a component by component and expanded on a component by component basis.

While there will still be separate charges for various switch components, most if not all components (such as processor, switch matrix, or the switching features) are purchased as a bundle of switch capabilities on a per-line (line-port) basis. That is, switching facilities are typically purchased on a per-line-port basis for a per-line-port price (for analog and digital lines) that provide for all necessary switching functions, including features, processor, switch fabric, etc.

By analogy, switches are now purchased very much in the same manner as consumers buy computers. Typically, the computer is assembled by the computer maker and delivered in one functional unit, ready for use. The computer will have a set of components that are designed and installed by the manufacturer to function together and to deliver a certain level of capacity. Customers do not have to purchase each individual component of the computer (though, of course, those components are still available on an individual basis.) This illustrates approximately how switches are purchased today under

the switch vendor contracts – on per unit basis without the need to purchase each individual component.[14]

Typically switching contracts cover multiple generations of agreements, each agreement superceding parts of the previous agreements and incorporating other parts. However, starting at some point in the early 1990's contracts increasingly reveal language that demonstrates that switch facilities were being purchased on a per-line and per-trunk basis. In fact, some ILECs have restructured their switch investment models to reflect that switches are generally purchased on a per-line and per-trunk basis.[15]

The new contracts reflect that the costs of facilities that were traditionally classified as usage-sensitive are in fact no longer usage-sensitive.[16] Under the contracts, the per-line prices provide for switch facilities capable of accommodating all reasonable levels of end user calling without any variations in cost. Switch lines for downtown switches to be used for high-volume business users cost will typically cost an ILEC no

[14] Central office switches are, of course, more than just big computers. They consist of three architectural components: the control structure, the switching matrix and the periphery (physical interfaces to which lines and trunks connect).

[15] Ameritech (before it merged with SBC) and SBC, for example, traditionally used the Telecordia model, SCIS, to estimate switch investments. In view of their switch vendor contracts, they have developed their own switch investment models, such ARPSM and SICAT, respectively, that better reflect the manner in which switch facilities are being purchased.

[16] The change in the structure of the switch vendor contracts is made possible, in part, by the fact that switch technologies, such as the processor, line and trunk modules, today are designed with so much spare capacity. It is the presence of spare capacity, among other things, that makes it possible for switch vendors to offer switches on a per-line and per-trunk port basis without having to be concerned about the possible variations in calling patterns among end-users, such as rural versus urban end-users. Further, there is also evidence that the greatly simplified price structure found in the switch vendor contracts is a result of the increased level of competition between switch vendors. In order for switch vendors to demonstrate their relative competitiveness, they have an incentive to provide their clients (the ILECs and others) with a relatively simple "apples-to-apples" price comparison. It is easy to see how, in the face of competitive pressures, the previously complex pricing schemes would over time be reduced to simple per-line price comparisons. Of course, this development was greatly facilitated by the fact that newer switch technologies, engineered with significant amounts of excess capacity, rendered the impact of variations in usage on individual switch components immaterial. As a result, the complexities of "a la carte," component-by-component switch vendor contracts were replaced by a simplified per-line and per-trunk pricing structure.

more than the switch lines for rural switches to be used by low-volume customers. While these switches may technically be engineered differently, *there are no significant cost differences to the ILEC itself.* Thus, given that there are no significant cost differences between urban and rural switches (on a per-line basis), there is no cost justification for adopting under TELRIC a usage-based cost recovery mechanism that extracts significantly higher revenues from the urban switch users than from the rural switch users.

Further, once the line is purchased, the per-line costs to the ILEC are the same *whether or not* the switch is used a lot (as in a downtown switch), a little (as in a rural switch) or not at all.

The general conclusions to be drawn from these observations are the following:

1. Switches are purchased on a per-line basis:

Switches are purchased on a per-line (port) basis for a price that includes all switching components necessary to accommodate call origination from and call termination to the line ports. Therefore, the categorization of switching costs into TS and NTS is a fiction created by cost models: it does not meaningfully reflect most switch vendor contracts and cost causation.

2. Usage is not a binding constraint on the switch:

The level of usage at the peak hour provided for under the standard analog line prices is exceptionally high and may not be limited at all. In general, the average line will

experience only a fraction of the peak CCS[17] that is permissible under the per-line prices in the contracts. As such, peak *usage* and surely off-peak usage is simply not a binding constraint on the switch. Therefore, from an economic perspective, there are no usage-sensitive costs.

3. Lines are the binding constraint:

Given that the switch is typically purchased on a per-line basis, it is clear that the number of lines is the binding constraint on a switch. As the number of lines on the switch grows, so does total switch investment in the switch. All switch costs are efficiently reduced to this cost driver as a matter of economics. Therefore, standard economic theory dictates that costs be driven towards the consumption of lines and not towards usage.

4. Even extreme usage conditions result only in small cost increases:

While in general, there are no higher prices for lines with higher call volumes, there are situations in which higher prices may apply for extremely high-volume lines. However, this is for lines with very high levels of CCS *at the peak hour*. Most important is, however, that even under these extreme usage conditions the per-line price (1) still applies, and (2) is only fractionally more expensive than for a low usage line.

Some additional observations are in order. First, to the extent that some ILECs may be able to show that there are higher prices for higher capacity lines in some of there contracts, this is still no argument for rejecting flat-rated switching proposals. More likely than not the higher capacity lines – by definition – will be the exception and not the

[17] CCS stands for 100 call seconds. One could use "one minute" (60 seconds) as a measure of time, but since it is easier to work with a decimal system, the unit of time is selected to be CCS (100 seconds). The issue here is the number of CCS that an end-user line uses the switch *at the peak hour*.

rule. Further, the higher prices for those few higher capacity lines can easily be blended into the larger base of ordinary lines. If this is done, one may find that as a practical matter, average per-line costs have changed little if at all.[18]

Further, data show that the average per-line level of CCS is generally holding steady over time. Apparently, peak hour calling patterns and calling habits are not subject to significant changes in the United States: they are about as stable as average life expectancy – it changes, but not by much. This is true even after as dramatic an event as the introduction of the Internet; data show that it hardly moved peak CCS levels.

This observation is important because it explains why switch vendors are able to offer telephone companies fixed per-line prices. It is only because peak usage is in fact very predictable and does not vary significantly, if at all, over time.

Traditionally, ILECs have countered requests for flat-rated switching with a variety of arguments that all center on claims that their switch costs increase when switch usage goes up. For all of the above reasons, these arguments are incorrect. Moreover, it should be recognized that any cost increases under the switch vendor contracts occur *if and only if* extraordinary switch-usage increases meet three additional conditions:

(a) The increase in usage occurs at the peak hour and not at some off peak hour.

(b) The increase in usage exceeds the amount of CCS for which a line is *historically*[19] engineered. For a newly purchased line, however, the vendors will place adequate capacity to accommodate the high peak usage without charging a higher

[18] If the percentage of high capacity lines is significant in certain geographic areas – which is implausible – than presumably geographic de-averaging could be used to differentiate flat-rated switching prices.
[19] As discussed above, while the ILEC may be able to show that they do have to augment these switches, typically this concerns older switches placed under older contracts and are situations not generally relevant to TELRIC.

price. The exception is lines with extremely high peak usage: those may cost more. However, such lines are unlikely to be basic analog lines, as high peak users would likely order high capacity lines.

(c) For switch facilities to require augmentation, usage has to increase for a large number of lines that terminate on the same switch, and not just for some small number of lines. When a small number of lines experience increased usage, they can be moved to a different switch module to be averaged with lower volume lines without the need to order additional facilities. (Of course, this may involve some telco labor/engineering. However, these labor costs represent regular central office maintenance and as such are included in and recovered through the ACFs. At issue here is a demonstration that switch *investments* do not vary with switch usage.)

In short, the claims that increases in usage cause an increase in costs – let alone a significant increase in costs – are simply wrong.

Further, as for claims that there is a difference between high-volume *business* customers and low-volume *residential* customers, those claims are wrong as well. The per-line prices in the switch vendor contracts typically do not differentiate between business customers and residential customers. Any difference in the volume of calls placed and received by these two customer classes has no ramification for switching costs as far as the vendors are concerned.

Next, the Commission may hear arguments that there is a difference between high-volume *urban* customers and low-volume *rural* customers. It is important for the

Commission to know that typically the per-line prices in the switch vendor contracts do not differentiate between urban customers and rural customers. Any difference in the volume of calls placed and received by urban or rural customers has no ramification for switching costs as far as the vendors are concerned.

There are typically different prices for host and remote switches. Switch vendors, however, do not typically differentiate between hosts placed in urban or in rural locations. Neither do the contracts differentiate between remotes placed in urban or rural locations. The vendors do not care whether the switch serves high-volume urban customers or low-volume rural customers – *the per-line switching prices are typically the same no matter where the facilities are installed.*

C. Peak-Load Pricing

In paragraph 132, the FCC also asks comments on the merit of "peak-period pricing for local switching and other shared facilities.[20]" In general, peak-period pricing is both unnecessary for local switching and unworkable.

Traditionally, the local switch would be engineered to accommodate peak load calling/usage. As discussed in the previous section, the per-line vendor contract prices recognize peak calling and provide for facilities generously in excess of expected CCS levels at the peak. As a practical matter, under current switch vendor contracts there is no capacity constraint at the peak for newly placed facilities. This means that there is little if any justification to adopt peak load pricing.

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[20] *Local Competition Order*, 11 FCC Rcd at 15878, para. 756-57.

Further, for peak-period pricing to be efficient it should truly correspond to the actual peak time period on which a given facility is experiencing a resource constraint. Given that the peak-period for any given facility occurs only on certain days in a year, and not with any regularity over the course of a day or a week, this type of pricing is mostly likely to be more trouble than it is worth assuming that capacity constraints do exist – and these comments argue that they do not.

D. What Are the Benefits of Flat-Rated Switching?

In paragraph 132, the FCC also ask about the "the benefits and drawbacks of such an approach?" The benefits of flat-rated switching are the following:

A flat-rated switching structure is consistent with cost causation under most switch vendor contracts. By contrast, usage-based switching charges have no foundation in cost causation and are at best an ad-hoc crude cost recovery mechanism.

A flat-rated switching structure avoids unintended cross-subsidies: costs are recovered in the manner that they are incurred and thus the CLEC is charged for each customer the costs that are caused by that customer, no more and no less. By contrast, usage-based rates result in huge unintended cross-subsidies. Given that switch costs do not vary with switch usage, high-volume users invariably end-up cross-subsidizing low-volume users. While in some circumstances, there may be policy justifications for cross-subsidies, no justification exists for these haphazard cross-subsidies.

A flat-rated switching structure places the CLEC purchasing the local circuit switching element on a level playing field with the ILEC as far as switching costs are

concerned (assuming all other aspects of the switching studies are done correctly) – the CLECs would incur not only the same costs but they would also incur those costs in the same manner as they are incurred by the ILEC. By contrast, usage-based rates create all sorts of unintended distortions. Most importantly, they creates an artificial cost barrier that may foreclose competition for high-volume customers. This barrier would be artificial because under the usage-based rates, the CLEC would incur switching costs for high-volume customers while the ILEC would not.

In fact, the imposition of usage-based charges for unbundled switching would distort the competitive market and provide the ILECs with an unfair competitive advantage. For the ILEC, the marginal cost of usage is, as I have explained, zero. Any charge, however small, for switch usage imposed on the CLEC would result in a positive marginal cost of usage for the CLEC. The CLEC would therefore be unable to match the price that the ILEC can set for high-usage customers.

Last, a flat-rated switching structure would allow CLECs to compete effectively in states in which the ILEC offers flat-rated local retail calling. Given that under the flat-rated switching structure, the CLEC would incur costs in the same manner as the ILEC, the two would operate on a level playing field. By contrast, usage-based rates would impair the CLECs in their ability to match the flat-rated retail offerings of the ILEC for high-volume customers.

As is discussed in the section below, all of these advantages have been recognized by the various state commissions that have adopted flat-rated switching.

E. A Number of States Have Recognized That Flat-Rated Switching Is Appropriate

The issue of whether or not switching costs are usage-sensitive has been litigated by a number of state commissions. The Illinois Commerce Commission ("ICC") in Consolidated ICC Docket Nos. 96-0486 and 96-0569, found that SBC/Ameritech – as claimed by intervenors – incurs switching costs on *per-line basis and not on a usage sensitive basis*. Specifically, the ICC found:

> Based on a review of Ameritech's switching contracts, it is clear that the primary basis used by switch vendors to charge Ameritech for its switches is a price per-line. Because Ameritech incurs switching costs on a predominantly per-line basis, we find it consistent with the fundamental principles of cost causation that the ULS [unbundled local switching] subscriber should also pay the ULS element primarily on a per-line basis, without a usage charge.[21]

The ICC then went on to mandate the following:

> Therefore, we require Ameritech to file a new ULS cost study which establishes prices primarily based on the flat-rate terms of its vendor contracts. [22]

In a subsequent proceeding, the Illinois Commission unequivocally reaffirmed its prior position on the issue of flat-rated switching, stating: "For all of these reasons, and those discussed below, we reject Ameritech's proposed ULS rates and adopt the flat-rated

[21] Second Interim Order, ICC Docket Nos. 96-0486/96-0569 (Consol.), p. 59 (February 17, 1998).
[22] Id.

ULS charge proposed by AT&T/WorldCom witness Dr. Ankum."[23] On August 21, 2002 Ameritech Illinois filed compliance tariffs under the Commission's July 10, 2002 order. The price for a voice grade basic line port, including all usage and all features is $2.18.[24]

The Indiana Commission completed a proceeding facing the same issues as this Commission does. Having reviewed a record that included all of SBC/Ameritech's switching contracts and an examination of switching costs, the Indiana Commission concluded the following:[25]

> Ameritech Indiana's assertion that without a usage-sensitive rate element for ULS it will be unable to recover its usage-related switching costs and will be forced to subsidize the switch usage of the CLECs and their customers is misleading, at best. ... Ameritech has assumed numerous facts not in evidence; we need not, and we will not, base our decision on the rate structure or rate levels for the ULS-ST offering on Ameritech's highly speculative arguments about the relative usage of Ameritech's switches, cost causation and allocation, and subsidization. ... Even without the many defects in Ameritech's arguments, we would still agree with Dr. Ankum that the charge for switching for the ULS-ST offering should be implemented on a flat-rate basis. A flat rate switching charge is consistent with retail markets in Indiana. In a climate where flat rate local service is important for many customers, allowing Ameritech to collect usage costs from its CLEC competitor-customers would place CLECs at a disadvantage.

Ameritech Indiana filed revised tariff sheets effective March 28, 2002 intended to comply with the Indiana Commission's Order. The recurring monthly rate for a voice grade basic line port is $2.982.[26] This price includes the line port, all usage on the switch and all features.

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[23] Order, ICC Docket No. 00-0700, p. 6 (July 10, 2002).
[24] Ill C.C. NO. 20, Part 19, Section 3, 5th Revised Sheet No. 40.
[25] Order, IURC Cause No. 40611-S1 Phase I, pp. 41-42 (March 28, 2002).
[26] IURC NO. 20, Part 19, Section 21, 1st Revised Sheet No. 43.

The Wisconsin Commission faced the same issues and found the following:[27]

> Digital switches are essentially large computers, and as the cost of computer memory has declined, so has the cost of extra capacity on the switch. The net result is that switch manufacturers design enough switching fabric and processor capacity into their switches to serve the maximum lines that can be installed on the switch without blockage, based upon the expected use per-line. In its own contracts with its switch vendors, Ameritech agreed to pay for its switches on a per-line basis without any usage fees, but there are provisions that assess extra charges when Ameritech needs to order additional equipment to accommodate usage growth. ... Ameritech did not provide any evidence that the requirement to provide unbundled switching caused it to add more capacity per-line to its switches or otherwise increased its contract costs. It also did not provide any evidence that customers would significantly increase their minutes of use merely because they became CLEC customers through the use of unbundled switching.

The Wisconsin commission then went on to note that: "because of the way the switches are engineered and the way Ameritech pays for its switches, *there is no compelling cost or engineering rationale for requiring a rate design that includes a minute-of-use charge.*"

On May 21, 2002, Ameritech Wisconsin filed revised tariff sheets intended to comply with the Commission's March 21, 2002 Final Decision. The rate for a voice grade basic line port, including all usage and all features is $3.06.[28]

The cost variation in the flat-rated switching rates is explained in part by the fact that both Illinois and Wisconsin are involved in ongoing compliance activities. The current compliance tariff voice grade basic line port estimates provided by Ameritech should be viewed as maximum values, subject to reduction as compliance proceedings

[27] Final Decision, PSC of Wisconsin, Docket No. 6720-TI-161, pp. 81-83 (March 21, 2002).
[28] P.S.C. OF W. 20, Part 19, Section 3 5th Revised Sheet No. 32.

are completed. Additionally, different states recover costs for items such as directory listings and intercept activities through various means (some included in the port rate, and others, such as California, elsewhere). Finally, different state commissions have made various determinations on the multiple cost model input values related to the voice grade basic line port cost calculation. Of the Ameritech states discussed here, the Illinois Commission has thus far come the closest to achieving the forward-looking, efficient cost level required by the TELRIC standard.

The Commission should note that the orders from the aforementioned commissions are directly relevant since the arguments regarding the alleged usage sensitivity of switching costs made by SBC/Ameritech in those proceedings are the same as those the Commission is likely to receive in the current proceeding. Again, those arguments were rejected in the face of record evidence on switch vendor contracts.

Other commissions outside of SBC's 13-state territory are also considering flat-rated switching. In a proceeding dealing with Qwest's Minnesota switching cost studies, among other issues, the Minnesota Public Utilities Commission recently issued an order reaffirming the conclusions of an Administrative Law Judge that switching costs do not vary with usage.[29] The ALJ found and the Minnesota Commission confirmed the following:[30]

> Even though it is allowable, Qwest has *not* presented sufficient evidence or reasoning *to justify using usage-based pricing* here.

[29] Order Setting Prices and Establishing Procedural Schedule, Minnesota PUC, Docket No. P-421/CI-01-1375, Docket No. P-442, 421, 3012/M-01-1916, p. A-2 (October 7, 2002). "Usage-based pricing: Do not allocate switching costs on the basis of the length of time a LEC or CLEC uses the switch; rather, allocate on the basis of the number of switch ports filled by each LEC or CLEC. ALJ Report p. 33."
[30] ALJ Order, OAH Docket No. 12 - 2500 - 14490 - 2, PUC Docket No. P-421/C1-01-1375 (August 2, 2002).

> There seems to be an underlying assumption that CLECs and their customers use their lines more than Qwest and its customers. Qwest's usage-based allocation would shift more cost to the CLECs.... [A]bsent evidence supporting usage-based pricing, it is most reasonable to require CLECs to pay for switching the same way that Qwest does—*on a per-line basis*.

In short, having had the opportunity to examine the proprietary switch vendor contracts in detail, all these commission in essence found that flat-rated switching structure is more consistent with cost causation than the usage-based rates proposed by the ILECs.

F. Is it Legal?

In paragraph 131, the FCC also asks whether "flat-rated recovery of switching costs [would] comply with the statutory pricing standard under section 252(d)(1)?" From an economic perspective, the answer to this question is: yes, such a cost structure is cost-based.

Section 252(d)(1) states, in relevant part, that "[d]eterminations by a state commission of... the just and reasonable rate for network elements for purposes of [section 251(c)(3)]...shall be based on the cost...of providing the...network element. These requirements are met under flat-rated switching, assuming all costs analyses have been performed correctly, for the following reasons. First, flat-rated switching ensures the ILEC a full recovery of its efficiently incurred forward-looking costs. Further, in terms of the rate-structure itself, it is consistent with the cost causation principle underlying the TELRIC methodology.

By contrast, usage-based rates are likely to be inconsistent with section 252(d)(1) when the switch vendor contracts contain per-line and per-trunk pricing structures. As discussed previously, given that switch costs under these types of contracts do not vary with usage, a usage-based price structure means that high-volume users will by definition over-recover their costs and low-volume users will by definition under-recover their costs. Thus, while the ILEC may earn revenues that recover the collective costs of *all* users, the usage-based price structure effects inadvertent cross-subsidies between high-volume and low-volume users. That is not cost-based pricing. Under flat-rated switching, no such subsidies occur -- each user pays for the costs he/she causes, no more and no less.

G. Rate Structure - Shared Transport (Paragraph 132)

In paragraph 132, the FCC also seeks comments on whether a flat-rated structure is "appropriate for shared transport." Specifically, the FCC asks: "should the costs of shared transport be allocated among carriers using a facility based on the proportion of lines each carrier connects to the transport facility?"

Unlike line ports and dedicated trunk ports, shared/common[31] end-office trunk port facilities are typically placed to accommodate call volumes aggregated across various users. When the volume of calls over shared and common transport facilities increases, there is a need to place additional facilities.[32] Thus, because the total costs

[31] The term "shared" and "common" are used to indicate that the ports are used to accommodate traffic from two or more carriers.

[32] The assumption underlying this statement is that at any point in time, end-office and interoffice trunking facilities are efficiently engineered with a minimal amount of spare capacity. Further, it is assumed that growth is uniform in that it occurs at peak and off-peak hours at approximately the same proportion.

associated with these facilities varies with call volumes, they are appropriately considered volume/usage-sensitive.

The same observations are true for shared transport. Shared transport facilities are placed to accommodate call volumes aggregated across various users. When these call volumes increase, additional facilities need to be placed. As such, the costs of these facilities are volume/usage-sensitive.

In view of the above, the most appropriate rate structure would still appear to be usage-sensitive and mileage sensitive (for transport facilities) rates. However, given the costs of measuring traffic that some ILECs have identified, the above considerations have to balanced against the costs of measuring traffic. Once this is done, it is possible that the costs of measuring may offset any benefits from having usage-based cost recovery mechanism.

IV. NON-RECURRING CHARGES: PARAGRAPHS 114-130

A. Identification of Costs: What Methodology Should Be Used for NRCs? (Paragraphs 116 – 117)

In paragraphs 116 and 117, the FCCs aks for comments on the following issue:

> [...] whether the state commission should assume a state-of-the-art network in calculating non-recurring costs just as it does with recurring costs, as our rules suggest,[33] or whether it should use a different network assumption that more closely reflects the costs associated with providing services on the incumbent LEC's existing network. [...] We ask parties to address whether our tentative conclusion in paragraph 52 should apply with respect to NRCs and, if it does, whether this ensures that incumbent LECs

[33] 47 C.F.R. § 51.507(e) ("Non-recurring charges . . . shall not permit an incumbent LEC to recover more than the total forward-looking cost of providing the applicable element.").

> will be able to recover all of their forward-looking costs of non-recurring activities.

First and foremost, it is important that there is consistency between the network construct assumed for recurring cost and the network construct assumed for non-recurring cost studies. As will be discussed below, the problem with many of the non-recurring cost studies filed by ILECs is that they do not adequately distinguish between costs that should be recovered through recurring charges and those that should be recovered through non-recurring charges. The result is often a double recovery of costs and non-recurring charges that are artificially high. To avoid these problems, it is important that the same network construct underlies both categories of studies – only then is it possible to accurately categorize costs and avoid double recovery.

Further, the answer to the question of whether the ILECs will be able the recover all of their "forward-looking costs" hinges on what is meant by that term. Obviously, if prices are set based more on the ILECs' actual costs – which appears to be the suggestion in paragraph 52 – then the ILECs will recover a different amount of costs than they would under TELRIC. The real question is, however, what costs should the ILEC be allowed to recover? As discussed elsewhere in the MCI comments, there are good reasons to adhere to the TELRIC construct developed by the FCC in its Local Competition Order. To the extent the FCC finds that TELRIC is still the appropriate standard for the recurring cost studies, it should also be the standard for the non-recurring cost studies.

Moreover, as will be discussed below, if costs are appropriately identified as recurring and non-recurring costs then the level of non-recurring cost should be considerably lower than proposed by most ILECs, since many of these costs would be recovered through recurring charges. As such, the issue of whether or not the ILEC will recover its "forward-looking costs" is in effect subsumed in the identification and recovery of recurring costs.

B. OSS Capabilities (Paragraph 118)

In paragraph 118, the FCC raises the following question:

> In light of our tentative conclusion to more closely account for the real-world attributes of the routing and topography of the incumbent LEC's existing network in developing forward-looking costs, what assumptions should be made with respect to the capability of the incumbent LEC's OSS?

The actual capabilities of the ILECs' OSS should be rejected as a benchmark for efficiency in the cost studies. The reasons for this are the following:

a. The actual OSS capabilities are limited due to errors in the legacy databases. The costs of cleaning up those databases should not be considered non-recurring costs.

b. The actual OSS capabilities are not reflective of state-of-the art OSS that would exist if markets were competitive. Due to their monopoly nature, the ILECs IT departments use a cost benefit analysis that leads to under-invest in OSS. (Of course, ILECs also have an incentive to handicap their dependent competitors.)

c. Evidence exists that higher flow-through rates are achievable by the ILECs' OSS than those reported in regulatory proceedings.

Each of these reasons is discussed in more detail below.

1. Errors in Legacy Data Bases Limit the Capabilities of the ILECs' OSS

Examination of ILEC cost studies shows that many of the manual activities and problem resolution activities, which constitute the bulk of the costs in service ordering as well as in service provisioning, stem from inefficient systems and errors in the ILECs' own legacy systems. Even if the ILECs' OSS had a higher degree of integration, these errors in the legacy systems would still cause endless manual intervention for purposes of the verification and clarification of work orders, corrections to the ILECs' data bases, etc.

It is not clear why the ILECs should not be held to the standards of commercial applications, such as online systems (orbitz.com for online air travel reservations, or amazon.com) or ATM machines. These commercial systems typically deal with situations of comparable complexity or greater complexity to those faced by ILECs. Orbitz.com provides users with a stunning amount of real-time access to prices and departures, involving the integration of the OSS of virtually all major airlines, hotels, rental car agencies and other entities that offer discount travel packages. And, again, this is accomplished on a areal time basis with ever changing departure times, prices and other terms and conditions. If orbitz.com, or an ATM, were to fail at the high rates of fall-out of some of the ILECs OSS systems, then consumers would simply stop using

those systems. Of course, consumers have alternatives to orbitz.com and ATMs and most other commercial applications – for UNEs, CLECs do not.

Last, to the extent that the service provisioning process stumbles because of errors in the ILECs' legacy systems, the costs of identifying those errors and correcting them are not costs that should be classified as non-recurring for purposes of determining non-recurring charges. Clearly, all carriers – ILECs and CLECs – will continue to benefit from cleaning up the data bases and, as such, the costs of these activities should – if they are to be recovered at all under TELRIC – be recovered through recurring charges. Thus, even if the Commission were to find that the capabilities of the ILECs' OSS are to be taken as a given, then it still does not follow that the costs associated with fall-out are to be recovered through non-recurring charges.

2. ILECs Under Invest in OSS

Second, the decision-making process used by ILECs' IT (Information Technology) departments, which are typically in charge of OSS improvements, appears flawed and typically fails to include a critical component: the costs and benefits to CLECs.

For example, the non-recurring costs witness for SBC in a cost proceeding in Indiana acknowledged that SBC's IT department only considers SBC's private costs and benefits of implementing OSS improvements. This assertion appears to be consistent with those made by other ILECs. While this decision making criterion would lead to a socially optimal decision in competitive markets, it leads decidedly to a sub-optimal situation in a monopoly setting. In competitive markets, a company's private benefits

would reflect potential gains in market share as customers would seek out the supplier that offers higher flow-through rates. This would induce the company to increase its spending on OSS to a socially optimal level. By contrast, the wholesale market for UNEs is not competitive and the ILECs are monopoly or near monopoly providers of UNEs and generally have shown little interest in accommodating CLECs. Thus, in the absence of competitive pressures on the ILECs' wholesale division, the ILECs have an incentive to and will *under-invest in their OSS.*

The costs and inefficiencies of under investment manifest themselves not just in higher fall-out rates but also in a host of other activities. For example, most ILEC studies will show enormous amounts of time spend by service reps and technicians on reviewing paper-based service orders, maintaining massive hard-copy (paper-based) back-up filing systems, lengthy service order close-out activities, and other time consuming manual activities. Many of these activities are either inefficient under all circumstances or would be unnecessary if the legacy data bases were not as polluted with errors as they currently are.

In sum, the ILECs' OSS and their actual fall-out rates should not presumptively be considered reasonable or efficient. Further, it is unreasonable to burden the CLECs with the costs of the associated inefficiencies.

3. Evidence Exists That High Flow-Through Is Possible

As noted, the ILECs' OSS and actual fall-out rates should *not* be viewed as *presumptively reasonable or efficient.* Indeed, evidence shows that some ILECs may

achieve higher fall-out rates in other contexts. A good example is SBC's EASE system, which SBC itself claims achieves flow-through (the inverse of fall-out) of 99%.

4. Many Commissions Have Now Adopted Low Fall-Out Rates

The general principles and the 2% fallout rate recommended in these comments were presented, evaluated and adopted in at least four other jurisdictions:

-- Illinois, ICC Docket No. 98-0396, October 16, 2001.

-- Massachusetts, D.P.U./D.T.E. 96-73/74, 96-75, 96-80/81, 96-83, 96-94-Phase 4-L consolidated arbitration, ruling dated October 1999.

-- Connecticut, Docket 97-04-10, decision dated May 1998 and Docket 98-09-01, decision dated November 1999.

-- Michigan, Case U-11280, order issued November 1999.

C. How Should OSS Costs Be Recovered? (Paragraph 118)

In paragraph 118, the FCC also asks a number of specific questions with respect to the recovery of OSS. First the FCC asks:

> Should the costs associated with OSS be recovered through expense factors or should separate charges be permitted? If charges to recover OSS costs are permitted, how should they be calculated?

OSS costs should be recovered through mark-ups above direct costs as part of general overhead expenses. As the FCC notes in the current NPRM, the costs of OSS cannot be portioned into costs associated with individual UNEs, or even into costs associated with just the ILECs' wholesale operations. This is surely true for the costs of the computer hardware that supports both the OSS for wholesale services (access services

and UNEs) as well many other systems the ILEC uses for its operations. To the extent that the OSS for the ILECs' wholesale operations need to tie into the ILECs' databases and other support systems, the costs are not readily identifiable either. In short, the costs of OSS are as much part of the common costs of the ILECs' operations as any overhead costs. As such, they are most efficiently and appropriately recovered through the general mark-ups for shared and common costs.

Further, to the extent that the costs of OSS are reflected in the shared and common costs mark-ups, they are recovered through both recurring and non-recurring charges, a result that seems appropriate as well. Moreover, under this type of cost recovery scheme, the issue of how the costs of OSS should be calculated is also resolved as the costs will automatically be rolled into the calculations for shared and common costs, which typically involve costs actually booked to the accounts of the company. That is, recovering the costs of OSS through shared and common cost mark-ups is likely to result in 100 percent recovery of the ILECs actual costs.

Next, the FCC asks whether incumbent LECs should "be permitted to recover through separate OSS charges the costs associated with systems that are used for both wholesale and retail services?" The answer is: no. In fact, to allow recovery of OSS costs – that are so clearly not assignable of a per service order basis – would run contrary to all principles that should guide the development of economically efficient cost recovery mechanisms.

SBC typically includes the costs of OSS in its cost studies in the form of computer processing costs. This practice has been objected to by CLECs in, for example,

a cost proceeding in Illinois. Agreeing with the CLECs, the ICC decided the computer processing costs should not be included in the NRC studies and noted:[34]

> We also agree with AT&T and MCI WorldCom that Ameritech should eliminate the computer processing costs it applies per service order. (Emphasis added.)

The ICC then went on to explain its rationale:

> These costs are *not* a direct cost to a CLEC ordering a UNE. Rather, computer processing costs are costs common to all network elements, and are more appropriately recovered through recurring charges. Recovery of computer processing costs via recurring charges is also consistent with the way Ameritech incurs its costs, which is on a monthly basis. Accordingly, we order Ameritech to remove all computer processing costs from its nonrecurring charges and to include these costs in the recurring charges for all UNEs to the extent Ameritech has not done so already. (Emphasis added.)

Thus, the ICC found that computer processing costs are not a direct cost of the CLEC ordering process and should therefore be eliminated from the NRC studies.

Last, the FCC asks in paragraph 118 about the allocation of the OSS costs between wholesale and retail:

> Given that many OSS upgrades affect both wholesale and retail functions, how should regulators allocate OSS costs between these functions? Should all costs of opening an incumbent LEC's OSS to competitors be borne by the competitors, or are there costs that are more appropriately spread among the incumbent LEC's retail customers as well?

As discussed previously, OSS costs should be recovered through shared and common cost mark-ups. To the extent that costs can be separately identified as costs related to wholesale and costs related to retail, this identification should guide cost

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[34] Illinois Commerce Commission Order, ICC Docket No. 98-0396, page 41.

recovery. However, as the FCC correctly noted, most of the costs associated with the development and maintenance of the ILECs' OSS are costs common to all of the ILECs operations. As such, no further partitioning of costs may be possible.

In any event, it is inappropriate to recoup the costs of the ILECs' OSS exclusively from the CLECs. As noted, these costs are predominantly common costs. Further, the CLECs are strictly speaking not the cost causers since to a large extent the OSS costs are onset costs associated with the Act of 1996. This means that if these costs are to be also recovered from CLECs, they at a minimum should be shared between all of the ILEC's operations, including its retail operations. An alternative way of viewing this is to recognize that if the costs are recouped from just CLECs than it will be only the CLECs' end users that pay for these OSS costs. This is not appropriate. In fact, since the ILECs' own retail customers benefit indirectly from competition – even though they themselves may not change providers – it is reasonable and economically efficient to have them pay their proportionate share of these costs.

D. Should Studies Use SME Opinions? (Paragraph 119)

In paragraph 119, the FCC seeks comments on the extent to which costs can be based on subject matter expert ("SME") opinions.

> We note that testimony on these issues in state TELRIC proceedings typically relies primarily, if not exclusively, upon the subjective opinions of panels of subject matter experts.[35] We seek comment on how state commissions might develop more objective evidence on non-recurring costs.

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[35] *See Qwest 9-State 271 Order*, 17 FCC Rcd at 26425, paras. 214, 216.

In principle, it should be appropriate to rely on SME inputs to populate cost studies. However, the reliance on subject matter experts for labor time estimates and other inputs in state cost proceedings has been problematic for a number of reasons.

First, the SME provided inputs are typically poorly supported and rely almost exclusively on the subjective estimates. The subjective judgment of the SME as a basis for cost studies is problematic because their judgments are likely to be seriously tainted by personal considerations regarding job security and other reasons for deliberately overestimating work times.

Further, the instructions to the SMEs typically fail to properly instruct the SMEs to provide labor time estimates consistent with TELRIC. To a large extent, this concerns the previously discussed issue of the failure to adequately distinguish between activities that benefit only the CLEC that places the service order (which represent non-recurring costs) and activities that benefit other CLECs and SBC itself (which represent recurring costs). For example, SMEs typically admit that they did not distinguish in their time estimates between testing and problem resolution activities required for just service activation and those that result from general maintenance of the network. Since the costs of the latter should be – and typically are already -- recovered through recurring charges, the labor time estimates are almost useless for establishing NRCs. The problems are compounded by the failure to properly instruct SMEs to provide estimates within the context of a TELRIC setting that reflects significantly higher flow-through rates than actually experienced by the SBC SMEs in SBC's actual operations. Since the TELRIC construct may require the assumption of a network construct and operations they do not

ordinarily experience, it is not clear how their "expert experience" can serve as a reliable foundation for the non-recurring charges. Again, the fact that the SMEs typically do not adequately document how their opinions are derived, it is virtually impossible for intervenors to validate their estimates. For example, SBC's SMEs just recently provided their estimates for travel times to reach work locations in a proceeding in Indiana. Clearly, given that SBC's operations in Indiana are not uniform and will involve widely varying travel times depending on whether it concerns rural or urban travel, one would expect a fairly sophisticated set of calculations involving averaging across various locations, central offices, types of jobs, etc. Yet, the SME estimates were entirely unsupported and presented on an "as is" basis.

If the FCC is to approve the use of SME provided inputs, it should set forth a detailed list of requirements to guide how these estimates are to be developed and documented. In the final analysis, however, it is probably more important that the SME estimate comport with (a) a forward-looking network and OSS construct, and (2) a proper classification of costs into recurring costs and non-recurring cost. It is especially the latter that would eliminate much of the controversy since many of the costs that typically are contested are either already being recovered through the recurring charges or should be classified as recurring cost.

As for the FCC's question as to whether "a shift to network assumptions that more closely track the incumbent LEC's existing network [would] eliminate some of the speculation that often characterizes state proceedings?", for all of the reasons just stated, to the contrary such a shift would on balance add inaccuracy and unreliability to the

process. But it would also result in completely inappropriate non-recurring charges for all the reasons discussed above. To be sure, this particular approach would not solve the fact that SME estimates are inherently biased, often unsupported and fail to distinguish between costs that should be recovered through recurring charges and those that should be recovered through non-recurring charges.

Last, the FCC inquires whether it is "appropriate to establish a presumption that an incumbent LEC's current practices with respect to non-recurring activities are efficient, or are an incumbent LEC's incentives to be efficient diminished when competitive LECs are the primary users of a particular activity?" As discussed previously, the ILECs' current practices should not presumptively be judged as efficient. To briefly recapitulate: the ILECs' under invest in their OSS by the standards of competitive markets, they have an incentive to handicap their dependent competitors, and the SME testimony detailing these "current practices" is inherently biased and unsupported.

E. When Should Costs Be Recovered Through NRCs? (Paragraph 122)

In paragraph 122, the FCC asks the following:

> Would allowing NRCs only for activities that solely benefit a specific competitive LEC reduce the number of activities for which NRCs would be permitted? For example, should installation of a cross-connect at a feeder/distribution interface (FDI) be subject to a NRC if such a facility typically remains in place after a customer terminates service?

The distinction between recurring costs and non-recurring is perhaps the most important issue with respect to determining appropriate NRCs. In general, the criterion

for classifying costs should be the following. If activities benefit only the CLEC placing the request for service, then the costs of these activities – to the extent that they are efficiently incurred – should be recovered from the CLEC through non-recurring charges. However, if other entities, such as other CLECs and the ILEC itself, benefit either immediately or over time, then the costs of these activities should be recovered through recurring charges.

An excellent discussion on this issue is found in the *Virginia Order*, in which the FCC notes:

> The costs at issue are labor costs associated with the activities necessary to provide UNEs to a competitive LEC. In many cases, these activities will produce benefits for any carrier using the facility in the future, and not just the initial competitive LEC for which the work is performed *(e.g.*, cross-connects made to complete a connection are likely to remain in place even if the end-user customer no longer takes service from the competitive LEC).

The *Virginia Order* then correctly goes on to note:

> Costs of non-recurring activities that benefit ***only*** the competitive LEC, or are not reflected in Verizon's ACF calculation *(e.g.*, certain types of loop conditioning), should be recovered through NRCs. (Emphasis added.)

Again, many of the problems with the ILECs' NRC studies can be reduced to the fact that often ILECs mischaracterize costs as non-recurring costs even though those activities and costs would benefit subsequent customers and should be recovered through recurring costs.

A good example of the co-mingling of recurring and non-recurring costs concerns the cleaning up of the legacy databases. As discussed, the ILECs' often high fall-out rates -- and the associated costs -- are often caused by errors in the ILECs' legacy

databases. The clean up of these databases, however, will benefit not only the CLEC placing the service order that falls out because of the errors in the databases, but all subsequent CLECs that place orders as well as SBC itself. For this reason (see previous discussion), all of the costs with cleaning up the databases are recurring costs and not non-recurring costs.

The co-mingling of recurring and non-recurring costs is often also found in the ILECs' provisioning cost studies. As the FCC notes, most of the costs of provisioning consist of the labor costs associated with activities (traveling, establishing cross-connects, and testing) at either the central office or outside plant location. To the extent that establishing cross-connects results in the permanent activation of facilities, the CLEC that orders the facility to be activated as well as other CLECs and the ILEC itself will benefit from this activity. Thus, using the criterion discussed previously, the costs of this activity are more properly characterized as recurring costs.

Further, given that the ILECs' SMEs typically provide time estimates for testing and problem resolution activities for *end to end facilities,* the cost studies for non-recurring costs tend to inappropriately co-mingle recurring costs and non-recurring costs. Any testing and repairs on facilities (distribution links, feeder facilities, CO facilities, etc.) benefit not just the CLEC that orders facilities but also subsequent CLECs and the ILEC itself. As such, the costs of these activities are recurring costs and *not* non-recurring costs. Clearer directives on this issue would resolve many of the debates now preoccupying state proceedings and reduce non-recurring charges.

Last, as the FCC itself has noted on many occasions, the practice of recouping costs through non-recurring charges tends to create barriers to entry and preclude competition where it might have been viable. By contrast, recognizing that many of the costs recovered through the ILECs' proposed non-recurring charges may in fact be more appropriately recouped through recurring charges has the added benefit that it lowers such potential barriers to entry.

The above discussion also answers the FCC's next question:

> Conversely, should placement of a cross-connect from the main distribution frame (MDF) in a central office to a competitive LEC's collocation space remain subject to a NRC because only the competitive LEC that orders the cross-connect would benefit from the work?

The answer is: yes, if the cost of establishing the cross-connect would truly only benefit the CLEC that issue the request for service.

F. Reducing NRCs and Recovering Costs Through RCs Simplifies Cost Studies and Allows ILECs to Recover Forward-Looking Costs (Paragraph 123)

In paragraph 123, the FCC asks whether "an approach that limits NRCs" could be implemented by the state commissions," and whether it would "provide incumbent LECs with full recovery of their forward-looking costs."

As discussed previously, this approach would greatly simplify the tasks of the state commissions. By giving clear directives on which types of costs should be recovered through recurring charges, much of the controversy and intractability of

testimony in state proceedings would be eliminated. Further, by properly characterizing costs as recoverable through recurring charges, the ILECs would be able to recover their forward-looking costs. This is true as long as all the appropriate costs are fully incorporated into the recurring charges since the recurring revenue streams generated by the recurring charges will provide the ILEC with ongoing cost recovery.

Operationally, this approach would be relatively simple to execute since it would follow the same methodology as used for annual charge factors. While the calculation of annual charge factors is not without its own complications, the methods are well established and state commissions appear to have experienced less frustration in coming to conclusions about these controversies than they have in dealing with conflicting opinions of ILEC SMEs and CLEC SMEs.

The FCC also asks: "How should carriers that have paid a NRC for a particular activity be credited if an incumbent LEC subsequently eliminates the NRC and recovers those same costs through recurring charges? " This problem of over-payment by CLECs to the ILECs is a pervasive one. As the FCC is well aware, UNE prices have steadily been reduced since the first round of state TELRIC proceedings. Clearly, the UNE prices that were initially established were artificially inflated and resulted in over-compensation of the ILECs at the expense of the CLECs. Great damage has been done in this regard and, in fact, a good number of CLECs might have been driven into bankruptcy as a result of this phenomenon. Further, given the fairly high churn rates experienced by the CLEC industry and the timing of TELRIC proceedings at state commissions, which may be completed after a CLEC customer has discontinued service, it is not clear how much

double recovery would occur or how it could be avoided or fixed. Last, at this point, CLECs would almost certainly prefer to see a reduction in non-recurring charges since the confluence of high churn rates and high non-recurring charges make it particularly difficult to acquire new customers profitably.

G. Recovering Costs Predominantly Through NRCs Would Greatly Complicate Cost Studies and may Lead to Over-Recovery of Costs (Paragraph 124)

In paragraph 124, the FCC raise s a number of questions about what it calls "a contrary approach, allowing NRCs for every activity related to a competitive LEC order." For all the reasons discussed previously, such an approach would have the following effects:

1. It would provide the ILECs with no incentive to further automate or mechanize their systems as they would be compensated for their costs whether or not those costs are efficiently incurred.
2. It would cause over-recovery since many of these costs are also recovered through recurring charges.
3. It would cause complicated corrections to the recurring cost studies to sort out which costs are recovered through the non-recurring cost studies. If costs are not appropriately eliminated from the recurring cost studies, then over-recovery occurs. Further, to the extent that certain maintenance related expenses may be incorporated into the non-recurring charges, retail rates may have to be adjusted as well since presumably retail rates are set at levels that at least in part reflect the cost of maintaining the public switched network.

4. It would cause unintended cross-subsidies as the non-recurring charges, paid by one single CLEC as a result of ordering one or more UNEs, would recover costs for activities from which other carriers, including the ILEC itself, will continue to benefit. To avoid these types of inappropriate cross-subsidies, complicated refund mechanisms would have to be put in place.
5. This method would cause non-recurring charges to be significantly higher than they should be and preclude competition where competition would otherwise be possible.
6. It would reduce barriers to entry

In short, an approach that recovers all costs associated with service activation -- irrespective of whether those costs are associated with activities that benefit only the CLEC placing the service order -- would result in a large number of undesirable consequences.

H. Disconnection Costs

1. Service Disconnects Do Not Necessitate Facility Disconnects (Paragraph 126)

As the FCC notes, ILEC non-recurring cost studies often tend to combine the costs of connecting and disconnecting facilities. This is problematic and incorrect for a number of reasons.

First, it inappropriately raises the upfront costs for CLECs and ignores that some customers may remain loyal for many years, if not decades, so that the disconnect costs

are in fact never incurred. To avoid non-recurring charges being unnecessarily high, there should be separate connect and disconnect charges.

Further, ILEC studies assume that *service* discontinuation requires a *facility* disconnect. This is untrue, inefficient and inconsistent with how ILECs actually runs their networks. There is no need for a technician to be dispatched at great cost for a service disconnect that can be postponed and performed when the technician needs to travel to that particular location for a service connection or other purpose. Also, in many instances, there is no need to disconnect facilities at all and it is in fact more desirable to leave facilities connected. (This issue also relates to the DIP and DOP rates discussed below).

Last, with IDLC and GR303 facilities, no physical disconnect activities are needed.

2. DIP and DOP Rates

In a TELRIC network there would be a higher percentage of IDLC systems, which have a near 100% DIP ("dedicated inside plant") rate. With IDLC, the loop facilities bypass the Main Distributing Frame ("MDF") and, for UNE-P configurations, go directly into the switch at the DS1 level. This means that service can be activated electronically without the need to physically establish cross-connects on the MDF and to run jumper cables. As such, DIP rates for UNE-P configurations with IDLC will be virtually 100%. Likewise, for UNE-L configurations, IDLC permits electronic loop provisioning as well.

Further, new technologies making automated distributing frames (ADF) practical have emerged and those technologies dramatically reduce the cost and size of electromechanical cross-connects, supporting thousands of any-to-any connections in a single 23-inch wide shelf.[36] While offering true metallic switching capabilities in an extremely high-density platform, these new devices finally make large copper switches economically feasible and available for actual deployment. ADF cross-connect systems are typically equipped with intelligent routing software and a scalable switching architecture enables it to grow linearly with subscriber demands. Using standard interface technology, ADF control processors and software are designed to integrate into telecom OSS for flow-through support of provisioning and maintenance.

Next, most of the facilities in the ILEC's network are working facilities that serve customers. They all represent DIP and DOP (dedicated outside plant). With respect to the outside plant facilities, when these facilities are in place and functioning, no connects or disconnect are needed.

I. Loop Conditioning – Paragraphs 129 - 130

In paragraph 130, the FCC raises a number of issues related to loop conditioning. First, the Commission asked for comment "on when and how the costs associated with loop conditioning should be recovered." The Commission references the *UNE Remand Order* and notes that "pursuant to industry engineering standards, loops under 18,000 feet

[36] Examples of manufacturers of ADF technology are Turnstone Systems, Inc. (http://www.turnstone.com), Oki Electric Industry Co. Ltd. (http://www.oki.com/jp/NSC/ENGLISH/PROD/S_MDF/smart-e.html), NHC Communications (www.nhc.com)

in length generally should be free of impairments such as load coils and excessive bridged taps.[37]" It then goes on to ask the following:

> Under a forward-looking costing methodology, should competitive LECs be required to pay the costs of conditioning such loops? Does the answer to this question depend on whether we retain the network assumptions of the current TELRIC rules? We noted in the *Triennial Review Order* that one option available to state commissions would be to permit NRCs for loop conditioning only in extraordinary circumstances, such as copper loops that are longer than 18,000 feet.[38] Is this a useful distinction? How, if at all, should such NRCs be distributed among the competitive LEC requesting the conditioning and future carriers that provide DSL service over the conditioned loop?

In general, *under a forward-looking costing methodology*, CLECs should *not* be required to compensate ILECs for the out-of-pocket costs associated with removing load coils, bridge tap or other "disturbers" that would not exist in a forward-looking network architecture. Most inappropriate are the typical ILEC proposals to recoup such costs through non-recurring charges.

The FCC's past decisions on how ILECs ought to be able to recover the costs of loop conditioning appear as a departure from (or exemption to) its TELRIC rules. In those past decisions, the FCC allowed an ILEC to recover costs associated with migrating its existing network toward a more forward looking architecture, instead of estimating costs based upon the assumption – consistent with TELRIC – that a more efficient, forward looking architecture is already in place.

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37 *UNE Remand Order*, 15 FCC Rcd at 3784, para. 193.

38 *Triennial Review Order* at para. 641. We note that load coils are not necessary for voice service on loops less than 18,000 feet in length and generally can be removed in a batch process; on loops in excess of 18,000 feet, however, load coils are needed for voice service and typically must be removed one loop at a time.

The recommendation that the costs of loop conditioning should not be recovered from CLECs in non-recurring charges *does not*, however, depend exclusively on a purist application of TELRIC and would remain the same whether or not the FCC "retains its network assumptions of the current TELRIC rules." The reason is that even under existing ILEC practices (i.e., the long adopted Carrier Serving Area – "CSA" Guidelines), and not just under a forward looking network architecture, carriers should be removing these disturbers from their networks at every available opportunity. The CSA guidelines were developed more than 20 years ago in an attempt to recognize the need for a multi-functional network, and disturbers that remain in the existing network are testimonial to the ILEC's tardiness in upgrading their network, even to standards they themselves proclaim. As such, to permit ILECs to recover the cost of removal of these disturbers is not just inconsistent with assumptions regarding a "forward looking" efficient network, it also is inconsistent with the requirements of efficient and proper network operations of the past.

There is another issue relative to loop conditioning that bears mentioning. Though never specifically required to do so by the FCC's rules, the vast majority of state commissions were incorrectly persuaded by ILECs to required CLECs to pay loop conditioning costs on a non-recurring basis. This meant that the first CLEC to request a conditioned loop would pay the entire cost associated with removing applicable disturbers (in many cases representing many hundreds of dollars). State commission's largely ignored the economic reality that once such a loop was "conditioned," it remained in its improved, digital-ready state for use by any other competitor (including the ILEC)

for the entire economic life of the loop. As such, notable economic value transfers were created with many carriers refusing to serve customers that required a conditioned loop, waiting instead for a competitor to first win the customer and incur the conditioning expense, before then marketing to that customer hoping to use the improved loop without incurring conditioning expenses itself. This uneconomic outcome is a direct result of recovering what are obviously capital improvement costs, as a non-recurring charge.

Instead of recovering loop-conditioning costs through non-recurring charges, the costs of conditioning activities should be recognized – if at all – as capital improvement initiatives, and the costs should be amortized over the economic life of the improved asset. As such, these costs would appropriately be recovered on a recurring basis from those carriers (including the ILEC) that use those improved facilities. Recovery of the costs in this manner will allow carriers to contribute over time to cost recovery for the conditioning activities based upon the proportionate use they make of those improved facilities, thereby removing any "first mover" penalties associated with the first carrier who happens to acquire a customer with a loop including disturbers.

It is important to note that simply requiring loop conditioning costs to be recovered via a recurring rate element (again, if it the costs of these embedded inefficiencies are to be recovered at all), however, is not enough. The FCC should inform state commissions that double recovery relative to conditioning costs is highly possible unless special attention is paid to the ILEC's annual charge factor development. Within the vast majority of the ACF models used by the ILECs, costs specific to maintaining

outside plant facilities are included and comprise a notable component of the ultimate ACF. Development of these maintenance factors is generally accomplished by dividing the ILEC's total maintenance expenses for a given time period (in many cases 3 years) by the amount of investment supported by those expenses over the same time period. The purpose of this exercise is to develop a direct maintenance-expenses-to-investment ratio that is ultimately used to gross-up raw investment (so as to capture maintenance expenses relative to investment). In nearly every such circumstance, the maintenance expenses used to develop the maintenance factor include the entirety of the ILEC's costs associated with conditioning. This results from the fact that the ILEC's technicians book conditioning time to accounts that are used to develop the maintenance expenses used in the numerator of the above explained ratio. Hence, unless the costs of loop conditioning are specifically excluded by the ILEC when developing its ACFs (I've not yet seen this done correctly), the ILEC will, when allowed to assess specific conditioning charges (whether recurring or non-recurring in nature) double recover its actual conditioning expenses.

The Oregon Commission is perhaps the only Commission to properly recognize this obvious problem in its Order in Docket Nos. UT-138 and 139, entered November 13, 1998. At page 68 of its Order, the Oregon Commission notes as follows:

> USWC concedes that the labor costs associated with unloading loops are currently included in the maintenance factor used to develop recurring costs. However, it claims that unloading costs are properly treated as nonrecurring costs because they are incurred each time a CLEC requests removal of coils and taps. USWC maintains that the appropriate solution is allow recovery of its proposed nonrecurring charges for loop unloading. It agrees to

> adjust its maintenance factor to avoid double recovery of these costs.

The Oregon Commission ultimately rejected US West's and GTE's proposal to recover loop conditioning costs via non-recurring rate elements. Instead the Oregon Commission set a rate of $0 for conditioning, recognizing that these expenses were already recovered in the ILEC's maintenance factors, and that, if these expenses were to be recovered at all, the recurring rates were a more economically rationale mechanism.

V. CONCLUSION

In this testimony I have discussed switching and non-recurring cost related issues. As demonstrated through these comments, a proper application of the FCC's TELRIC costing and pricing methodology, as discussed in the Local Competition order, in most instances ensures the achievement of a number of important policy objectives: it results in UNE prices that (1) promote competition, (2) send efficient price signals to all market participants, and (3) afford the ILECs the opportunity to recover efficiently incurred costs in a fair and equitable manner.

Declaration

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 16, 2003.

August H. Ankum

Curriculum Vitae

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I am an economist and consultant, specializing in public utility regulation. In this capacity, I have provided consulting services in the major telecommunications markets of the United States, such as New York, Texas, Illinois, Michigan, Tennessee, Georgia, and in a variety of smaller states. My consulting activities focus mostly on telecommunications regulation. Specifically, I work with large corporate clients, such as MCIWorldCom, AT&T, AT&T Wireless, and a variety of smaller competitive local exchange carriers and PCS providers. I have represented these clients before state and federal regulatory agencies in various proceedings concerning the introduction of competition in telecommunications markets. Recently, these proceedings focus largely on the implementation of the pro-competition provisions of Telecommunications Act of 1996.

Professional experience:

My professional background includes work experiences in private industry and state government. I have worked for MCI Telecommunications Corporation ("MCI") as a senior economist. At MCI, I provided expert witness testimony and conducted economic analyses for internal purposes. Prior to joining MCI in early 1995, I worked for Teleport Communications Group, Inc. ("TCG"), as a Manager in the Regulatory and External Affairs Division. In this capacity, I testified on behalf of TCG in proceedings concerning local exchange competition issues. From 1986 until early 1994, I was employed as an economist by the Public Utility Commission of Texas ("PUCT") where I worked on a variety of electric power and telecommunications issues. During my last year at the PUCT I held the position of chief economist. Prior to joining the PUCT, I taught undergraduate courses in economics as an Assistant Instructor at the University of Texas from 1984 to 1986.

Education:

I received a Ph.D. in Economics from the University of Texas at Austin in 1992, an M.A. in Economics from the University of Texas at Austin in 1987, and a B.A. in Economics from Quincy College, Illinois, in 1982.

PROCEEDINGS IN WHICH DR. ANKUM HAS FILED EXPERT WITNESS TESTIMONY:

New York

Commission Investigation into Resale, Universal Service and Link and Port Pricing, New York Public Service Commission, Case Nos. 95-C-0657, 94-C-0095, and 91-C-1174, July 4, 1996. On behalf of MCI Telecommunications Corporation.

In the Matter of Proceeding on Motion of the Commission To Reexamine Reciprocal Compensation, New York Public Service Commission, Case 99-C-0529. Direct Testimony, July 1999. On Behalf Of Cablevision LightPath, Inc.

Proceeding on the Motion of the Commission To Examine New York Telephone Company's Rates for Unbundled Network Elements, New York Public Service Commission, Case 98-C-1357. Direct Testimony, October 1999. On behalf of Corecomm New York, Inc.

Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements, New York Public Service Commission Case 98-C-1357, Direct Testimony, June 2000, on behalf of MCIWorldCom.

New Jersey

Petition of Focal Communications Corporation of New Jersey For Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement with Bell Atlantic – New Jersey Board of Public Utilities, May 2000. On behalf of Focal Communications Corporation of New Jersey.

I/M/O the Board's Review of Unbundled Network Elements Rates, Terms and Conditions of Bell Atlantic-New Jersey, Inc. New Jersey Board of Public Utilities, Docket No. TO00060356. 2000. On behalf of WorldCom, Inc.

Delaware

Petition of Focal Communications Corporation of Pennsylvania For Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement with Bell Atlantic – Delaware, Inc. Delaware Public Service Commission, PSC Docket No. 00-025. Direct Testimony, May 2000. On behalf of Focal Communications Corporation of Pennsylvania.

Texas

Petition of The General Counsel for an Evidentiary Proceeding to Determine Market Dominance, PUC of Texas, Docket No. 7790, Direct Testimony, June 1988. On behalf of the Public Utility Commission of Texas.

Application of Southwestern Bell Telephone Company for Revisions to the Customer Specific Pricing Plan Tariff, PUC of Texas, Docket No. 8665, Direct Testimony, July 1989. On behalf of the Public Utility Commission of Texas.

Application of Southwestern Bell Telephone Company to Amend its Existing Customer Specific Pricing Plan Tariff: As it Relates to Local Exchange Access through Integrated Voice/Data Multiplexers, PUC of Texas, Docket No. 8478, Direct Testimony, August 1989. On behalf of the Public Utility Commission of Texas.

Application of Southwestern Bell Telephone Company to Provide Custom Service to Specific Customers, PUC of Texas, Docket No. 8672, Direct Testimony, September 1989. On behalf of the Public Utility Commission of Texas.

Inquiry of the General Counsel into the Reasonableness of the Rates and Services of Southwestern Bell Telephone Company, PUC of Texas, Docket No. 8585, Direct Testimony, November 1989. On behalf of the Public Utility Commission of Texas.

Southwestern Bell Telephone Company Application to Declare the Service Market for CO LAN Service to be Subject to Significant Competition, PUC of Texas, Docket No. 9301, Direct Testimony, June 1990. On behalf of the Public Utility Commission of Texas.

Petition of Southwestern Bell Telephone Company for Authority to Change Rates, PUC of Texas, Docket No. 10382, Direct Testimony, September 1991. On behalf of the Public Utility Commission of Texas.

Application of Southwestern Bell Telephone Company, GTE Southwest, Inc., and Contel of Texas, Inc. For Approval of Flat-rated Local Exchange Resale Tariffs Pursuant to PURA 1995 Section 3.2532, Public Utility Commission of Texas, Docket No. 14658, January 24, 1996. On behalf of Office of Public Utility Counsel of Texas.

Application of Southwestern Bell Telephone Company, GTE Southwest, Inc., and Contel of Texas, Inc. For Interim Number Portability Pursuant to Section 3.455 of the Public Utility Regulatory Act, Public Utility Commission of Texas, Docket No. 14658, March 22, 1996. On behalf of Office of Public Utility Counsel of Texas.

Application of AT&T Communications for Compulsory Arbitration to Establish an Interconnection Agreement Between AT&T and Southwestern Bell Telephone Company, and Petition of MCI for Arbitration under the FTA96, Public Utility Commission of Texas, Consl. Docket Nos. 16226 and 16285. September 15, 1997. On behalf of AT&T and MCI.

Proceeding to examine reciprocal compensation pursuant to section 252 of the Federal Telecommunications of 1996, Public Utility Commission of Texas, Docket No. 21982. May 2000. On behalf of Taylor Communications.

Iowa

US West Communications, Inc., Iowa Department of Commerce – Utilities Board, Docket No: RPU – 00 – 01. Direct Testimony, July 2000. On behalf of McLeodUSA.

Illinois

Adoption of Rules on Line-Side Interconnection and Reciprocal Interconnection, Illinois Commerce Commission, Docket No. 94-0048. September 30, 1994. On behalf of Teleport Communications Group, Inc.

Proposed Introduction of a Trial of Ameritech's Customer First Plan in Illinois, Illinois Commerce Commission, Docket No. 94-0096. September 30, 1994. On behalf of Teleport Communications Group, Inc.

Addendum to Proposed Introduction of a Trial of Ameritech's Customer First Plan in Illinois, Illinois Commerce Commission, Docket No. 94-0117. September 30, 1994. On behalf of Teleport Communications Group, Inc.

AT&T's Petition for an Investigation and Order Establishing Conditions Necessary to Permit Effective Exchange Competition to the Extent Feasible in Areas Served by Illinois Bell Telephone Company, Illinois Commerce Commission, Docket No. 94-0146. September 30, 1994. On behalf of Teleport Communications Group, Inc.

Proposed Reclassification of Bands B and C Business Usage and Business Operator Assistance/Credit Surcharges to Competitive Status, Illinois Commerce Commission, Docket No.

95-0315, May 19, 1995. On behalf of MCI Telecommunications Corporation.

Investigation Into Amending the Physical Collocation Requirements of 83 Ill. Adm. Code 790, Illinois Commerce Commission, Docket 94-480, July 13, 1995. On behalf of MCI Telecommunications Corporation.

Petition for a Total Local Exchange Wholesale Tariff from Illinois Bell Telephone Company d/b/a Ameritech Illinois and Central Telephone Company Pursuant to Section 13-505.5 of the Illinois Public Utilities Act, Illinois Commerce Commission, Docket No. 95-0458, December 1995. On behalf of MCI Telecommunications Corporation.

Citation to Investigate Illinois Bell Telephone Company's Rates, Rules and regulations For its Unbundled Network Component Elements, Local Transport Facilities, and End office Integration Services, Illinois Commerce Commission, Docket No. 95-0296, January 4, 1996. On behalf of MCI Telecommunications Corporation.

In the Matter of MCI Telecommunications Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish and Interconnection Agreement with Illinois Bell Telephone Company d/b/a Ameritech Illinois, Illinois Commerce Commission, Docket No. 96-AB-006, October, 1996. On behalf of MCI Telecommunications Corporation.

In the Matter of MCI Telecommunications Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish and Interconnection Agreement with Central Telephone Company of Illinois ("Sprint"), Illinois Commerce Commission, Docket No. 96-AB-007, January, 1997. On behalf of MCI Telecommunications Corporation.

Investigation into forward looking cost studies and rates of Ameritech Illinois for interconnection, network elements, transport and termination of traffic. Illinois Commerce Commission, Docket No. 96-0486, February, 1997. On behalf of MCI Telecommunications Corporation.

Phase II of Ameritech Illinois TELRIC proceeding. Illinois Commerce Commission Docket No. 98-0396, May 2000. On behalf of MCIWorldCom.

Illinois Commerce Commission On its Motion vs Illinois Bell Telephone Company Investigation into Tariff Providing Unbundled Local Switching with Shared Transport, Illinois Commerce Commission, Docket No. 00- 0700. October 2001. On behalf of AT&T Communications of Illinois, Inc. and WorldCom, Inc.

Massachusetts

NYNEX/MCI Arbitration, Common Wealth of Massachusetts, Department of Public Utilities,

D.P.U. 96-83, October 1996. On behalf of MCI Telecommunications Corporation.

Investigation into Pricing based on TELRIC for Unbundled Network Elements and Combinations of Unbundled Networks Elements and the Appropriate Avoided Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services. Massachusetts Department of Energy and Transportation, Docket 01-20. On behalf Allegiance, Network Plus, Inc., El Paso Networks, LLC, and Covad Communications Company. July 2001.

Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Regulatory Plan to succeed Price Cap Regulation for Verizon New England, Inc. d/b/a Verizon Massachusetts' intrastate retail telecommunications services in the Commonwealth of Massachusetts. Massachusetts Department of Energy and Transportation, Docket 01-03. On behalf of Network Plus, Inc., August 2001.

New Mexico

Brooks Fiber Communications of New Mexico, Inc. Petition for Arbitration, New Mexico State Corporation Commission, Docket No. 96-307-TC, December, 1996. On behalf of Brooks Fiber Communications of New Mexico, Inc.

Michigan

In the Matter of the Application of City Signal, Inc. for an Order Establishing and Approving Interconnection Arrangements with Michigan Bell Telephone Company, Michigan Public Service Commission, Case No. U-10647, October 12, 1994. On behalf of Teleport Communications Group, Inc.

In the Matter, on the Commission's Own Motion, to Establish Permanent Interconnection Arrangements Between Basic Local Exchange Providers, Michigan Public Service Commission, Case No. U-10860, July 24, 1995. On behalf of MCI Telecommunications Corporation.

In the Matter, on the Commission's Own Motion, to consider the total service long run incremental costs and to determine the prices for unbundled network elements, interconnection services, resold services, and basic local exchange services for Ameritech Michigan, Michigan Public Service Commission, Case No. U-11280, March 31, 1997. On behalf of MCI Telecommunications Corporation.

In the matter of the application under Section 310(2) and 204, and the complaint under Section 205(2) and 203, of MCI Telecommunications Corporation against AMERITECH requesting a reduction in intrastate switched access charges, Case No. U-11366. April, 1997. On behalf of MCI Telecommunications Corporation.

Ohio

In the Matter of MCI Telecommunications Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish and Interconnection Agreement with Ameritech Ohio, The Public Utilities Commission of Ohio, Case No. 96-888-TP-ARB, October, 1996. On behalf of MCI Telecommunications Corporation.

In the matter of the review of Ameritech Ohio's economic costs for interconnection, unbundled network elements, and reciprocal compensation for transport and termination of local telecommunications traffic, The Public Utilities Commission of Ohio, Case No. 96-922-TP-UNC, Jan 17, 1997. On behalf of MCI Telecommunications Corporation.

In the Matter of the Review of Ameritech Ohio's Economic Costs for Interconnection, Unbundled Network Elements, and Reciprocal Compensation for Transport and Termination of Local Telecommunications Traffic. Case No. 96-922-TP-UNC and In the Matter of the Application of Ameritech Ohio for Approval of Carrier to Carrier Tariff. Case No. 00-1368-TP-ATA. Ohio Public Utilities Commission. Direct Testimony, October 2000. On behalf of MCIWorldCom and ATT of the Central Region.

Indiana

In the matter of the Petition of MCI Telecommunications Corporation for the Commission to Modify its Existing Certificate of Public Convenience and Necessity and to Authorize the Petitioner to Provide certain Centrex-like Intra-Exchange Services in the Indianapolis LATA Pursuant to I.C. 8-1-2-88, and to Decline the Exercise in Part of its Jurisdiction over Petitioner's Provision of such Service, Pursuant to I.C. 8-1-2.6., Indiana Regulatory Commission, Cause No. 39948, March 20, 1995. On behalf of MCI Telecommunications Corporation.

In the matter of the Petition of Indiana Bell Telephone company, Inc. For Authorization to Apply a Customer Specific Offering Tariff to Provide the Business Exchange Services Portion of Centrex and PBX Trunking Services and for the Commission to Decline to Exercise in Part Jurisdiction over the Petitioner's Provision of such Services, Pursuant to I.C. 8-1-2.6, Indiana regulatory Commission, Cause No. 40178, October 1995. On behalf of MCI Telecommunications Corporation.

MCI Telecommunications Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish and Interconnection Agreement with Indiana Bell Telephone Company d/b/a Ameritech Indiana, Indiana Public Utility Regulatory Commission, Cause No. 40603-INT-01, October 1996. On behalf of MCI Telecommunications Corporation.

In the matter of the Commission Investigation and Generic Proceeding on Ameritech Indiana's Rates for Interconnection Service, Unbundled Elements and Transport and Termination under the Telecommunications Act of 1996 and Related Indiana Statutes, Indiana Public Utility Regulatory Commission, Cause No. 40611. April 18, 1997. On behalf of MCI Telecommunications Corporation.

In the Matter of the Commission Investigation and Generic Proceeding on GTE's Rates for Interconnection, Service, Unbundled Elements, and Transport under the FTA 96 and related Indiana Statutes, Indiana Public Utility Regulatory Commission, Cause No. 40618. October 10, 1997. On behalf of MCI Telecommunication Corporation.

In the matter of the Commission Investigation and Generic proceeding on the Ameritech Indiana's rates for Interconnection, Unbundled Elements, and Transport and Termination Under the Telecommunications Act of 1996 and Related Indiana Statutes, Indiana Utility Regulatory Commission, Cause No. 40611-S1. October 2001. On behalf of WorldCom, Inc., AT&T Communications of Indiana, G.P.

Rhode Island

Comprehensive Review of Intrastate Telecommunications Competition, State of Rhode Island and Providence Plantations Public Utilities Commission, Docket No. 2252, November, 1995. On behalf of MCI Telecommunications Corporation.

Vermont

Investigation into NET's tariff filing re: Open Network Architecture, including the Unbundling of NET's Network, Expanded Interconnection, and Intelligent Networks, Vermont Public Service Board, Docket No. 5713, June 8, 1995. On behalf of MCI Telecommunications Corporation.

Wisconsin

Investigation of the Appropriate Standards to Promote Effective Competition in the Local Exchange Telecommunications Market in Wisconsin, Public Service Commission of Wisconsin, Cause No. 05-TI-138, November, 1995. On behalf of MCI Telecommunications Corporation.

Matters relating to the satisfaction of conditions for offering interLATA services (Wisconsin Bell, Inc. d/b/a Ameritech Wisconsin) Wisconsin Public Service Commission, 670-TI-120, March 25, 1997. On behalf of MCI Telecommunications Corporation.

In the Matter of MCI Telecommunications Corporation Petition for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Interconnection Agreement with Wisconsin Bell, Inc. d/b/a Ameritech Wisconsin, Wisconsin Public Service Commission, Docket Nos. 6720-MA-104 and 3258-MA-101. On behalf of MCI Telecommunications Corporation.

Investigation Into The Establishment of Cost-Related Zones For Unbundled Network Elements, Docket No. 05-TI-349. Rebuttal Testimony, September 2000. On behalf of AT&T Communications of Wisconsin, McLEODUSA Telecommunications Services, Inc., TDS MetroCom, Inc., and Time Warner Telecom.

Pennsylvania

In Re: Formal Investigation to Examine Updated Universal Service Principles and Policies for telecommunications Services in the Commonwealth Interlocutory order, Initiation of Oral Hearing Phase, Pennsylvania Public Utility Commission, Docket No. I-00940035, February 28, 1996. On behalf of MCI Telecommunications Corporation.

Structural Separation of Verizon, Pennsylvania Public Utility Commission - Docket No. M-0001352. Direct Testimony, October, 2000. On behalf of MCI WorldCom.

Georgia

AT&T Petition for the Commission to Establish Resale Rules, Rates and terms and Conditions and the Initial Unbundling of Services, Georgia Public Service Commission, Docket No. 6352-U, March 22, 1996.On behalf of MCI Telecommunications Corporation.

Tennessee

Avoidable Costs of Providing Bundled Services for Resale by Local Exchange Telephone Companies, Tennessee Public Service Commission, Docket No. 96-00067, May 31, 1996. On behalf of MCI Telecommunications Corporation.

Commonwealth of Puerto Rico

Petition for Arbitration Pursuant to 47 U.S.C. & (b) and the Puerto Rico Telecommunications Act of 1996, regarding Interconnection Rates Terms and Conditions with Puerto Rico Telephone Company, Puerto Rico Telecommunications Regulatory Board, Docket No. 97-0034-AR, April 15, 1997. On behalf of Cellular Communications of Puerto Rico, Inc.

ATTACHMENT II
STUDIES PROVIDED IN RESPONSE TO PARAGRAPH 81

Paragraph 81. We ask parties to explain in detail the methodology that should be used to develop total cost and total demand under this approach. We also invite parties to submit studies showing how to develop an unbundled switching price. These studies should assume that service is provided using modern digital switches that are installed today. We ask that commenters develop this price for either an incumbent LEC's study area or a UNE zone within a study area. One study should develop the costs of initial new equipment and all future growth equipment that is expected to be installed periodically over the life of the switch. A second study should develop costs for these two components plus costs of all future technology upgrade equipment that is expected to be installed periodically over the life of the switch. Parties should explain and fully document the methodology, assumptions, and data they use to estimate these costs and the demand over which these costs are spread. If a commenter believes UNE prices should be based on a switch technology other than digital technology, that party may submit other studies in addition to, rather than in place of, the studies request above.

INPUTS

	Value
Cost of capital	9%
Economic life	15
Line to trunk ratio	5
Fill factors	
Analog lines	95%
Digital Lines	95%
End office Trunks	97%

Technology Mix Current Period t=0		
Vendor 1	**Quantities**	**Percentage**
Total Quantities		
Analog lines	2,000,000	57.1%
Digital lines	300,000	60.0%
EO trunks	460,000	57.5%
Number of Vendor 1 switches	49	56.3%
Vendor 2	**Quantities**	**Percentage**
Total Quantities		
Analog lines	1,500,000	42.9%
Digital lines	200,000	40.0%
EO trunks	340,000	42.5%
Number of Vendor 2 switches	38	43.7%

QUANTITIES - LINES & TRUNKS

Vendor 1

	Cutover Period t=0	Cumulative Growth % (Present value)	End Economic Life Period t=15	Line to Trunk Ratio	Total Quantities (Present Value)	Precentage
Analog lines	2,000,000	9.77%	2,195,496		2,195,496	57.1%
Digital lines	300,000	12.41%	337,230		337,230	60.0%
EO Trunks	460,000	9.52%	503,774	5	2,518,871	57.5%
Total Quantities					**5,051,597**	

Vendor 2

	Cutover Period t=0	Cumulative Growth % (Present value)	End Economic Life Period t=15	Line to Trunk Ratio	Total Quantities (Present Value)	
Analog lines	1,500,000	9.77%	1,646,622		1,646,622	42.9%
Digital lines	200,000	12.41%	224,820		224,820	40.0%
EO Trunks	340,000	9.52%	372,355	5	1,861,775	42.5%
Total Quantities					**3,733,216**	

Technology Mix Over Life of switch	
Analog	87.2%
Digital	12.8%
total	100.0%

ANALOG LINES

This sheet calculates the relative percentage of new and growth analog lines based on the following assumptions:
Cost of capital - 9%
Economic life of switch - 15 years
Annual growth rates that vary from 0% to 3%, as specified below.

Cost of Capital	9.00%

Cutover Lines	Growth Lines
100	10
91.1%	8.9%

Years	Growth Rate	Base 100	Annual Growth Lines	NPV Line Growth	NPV Cumulative Growth
1	1.00%	101	1.00	0.92	0.92
2	1.00%	102	1.01	0.85	1.77
3	0.50%	103	0.51	0.39	2.16
4	0.50%	103	0.51	0.36	2.52
5	0.00%	103	0.00	0.00	2.52
6	1.00%	104	1.03	0.61	3.14
7	1.00%	105	1.04	0.57	3.71
8	1.00%	106	1.05	0.53	4.24
9	1.00%	107	1.06	0.49	4.72
10	2.00%	109	2.14	0.91	5.63
11	2.00%	112	2.19	0.85	6.48
12	3.00%	115	3.35	1.19	7.67
13	2.00%	117	2.30	0.75	8.42
14	2.00%	120	2.34	0.70	9.12
15	2.00%	122	2.39	0.66	9.77
	Total Switched Lin	122			9.77%

DIGITAL LINES

This sheet calculates the relative percentage of new and growth digital lines based on the following assumptions:
Cost of capital - 9%
Economic life of switch - 15 years
Annual growth rates that vary from 0% to 3%, as specified below.

Cost of Capital	**9.00%**

Cutover Lines	Growth Lines
100	**12**
89.0%	**11.0%**

Years	Growth Rate	Base 100	Annual Growth Lines	NPV Line Growth	Cumulative Growth
1	1.00%	101	1.00	0.92	0.92
2	2.00%	103	2.02	1.70	2.62
3	2.50%	106	2.58	1.99	4.61
4	2.00%	108	2.11	1.50	6.10
5	1.00%	109	1.08	0.70	6.80
6	0.50%	109	0.54	0.32	7.13
7	0.50%	110	0.55	0.30	7.43
8	1.00%	111	1.10	0.55	7.98
9	1.00%	112	1.11	0.51	8.49
10	1.00%	113	1.12	0.47	8.96
11	1.00%	114	1.13	0.44	9.40
12	2.00%	117	2.29	0.81	10.21
13	3.00%	120	3.50	1.14	11.35
14	2.00%	123	2.40	0.72	12.07
15	1.00%	**124**	1.23	0.34	**12.41**
	Total Switche	**124**			**12.41%**

This sheet calculates the relative percentage of new and growth End Office trunks based on the following assumptions:
Cost of capital - 9%
Economic life of switch - 15 years
Annual growth rates that vary from 0% to 3%, as specified below.

Cost of Capital	9.00%

Cutover Trunks	NPV Growth Trunks
100	10
91.3%	8.7%

Years	Growth Rate	Base 100	Annual Growth Lines	NPV Line Growth	Cumulative Growth
1	0.00%	100	0.00	0.00	0.00
2	0.50%	101	0.50	0.42	0.42
3	0.50%	101	0.50	0.39	0.81
4	0.50%	102	0.51	0.36	1.17
5	1.00%	103	1.02	0.66	1.83
6	1.00%	104	1.03	0.61	2.44
7	2.00%	106	2.07	1.13	3.57
8	1.00%	107	1.06	0.53	4.10
9	2.00%	109	2.13	0.98	5.08
10	2.00%	111	2.18	0.92	6.00
11	2.00%	113	2.22	0.86	6.86
12	3.00%	117	3.40	1.21	8.07
13	2.00%	119	2.33	0.76	8.83
14	1.00%	120	1.19	0.36	9.19
15	1.00%	121	1.20	0.33	9.52
	Total Switche	121			9.52%

VENDOR EF&I PRICES

VENDOR 1	
Facility	**EF&I Price**
Analog line - new	$ 60.00
Analog line - growth	$ 95.00
Digital line - new	$ 60.00
Digital line - growth	$ 80.00
End office trunk port DS0 Level - new	$ 90.00
End office trunk port DS0 Level - growth	$ 120.00
Getting Started - Base Unit per switch	$ 200,000
Software & feature costs	$ 19,000,000
Per line feature costs	$ 2.50

VENDOR 2	
Facility	**EF&I Price**
Analog line - new	$ 40.00
Analog line - growth	$ 85.00
Digital line - new	$ 55.00
Digital line - growth	$ 70.00
End office trunk port DS0 Level - new	$ 70.00
End office trunk port DS0 Level - growth	$ 90.00
Getting Started - Base Unit per switch	$ 1,000,000
Software & feature costs	$ 13,000,000
Per line feature costs	$ 1.50

Note: Under a strict reading of TELRIC, one would base switching investments on the least-cost carrier. In this cost study example, switch investments are, for purposes of illustration, based on a blend of two carriers, even though Vendor 1 is here demonstrably the least-cost supplier. (This is ascertained from the Tab: Unit Investments.)

VENDOR 1 - BLENDED PRICES

This sheet blends new and growth prices

ANALOG LINES calculated based on blend of new and growth

	Line price	Weight	Weighted Unit Price
New price	$ 60.00	91.10%	$ 54.66
Growth price	$ 95.00	8.90%	$ 8.46
Unit price			**$ 63.12**

DIGITAL LINES LINES calculated based on blend of new and growth

	Line price	Weight	Weighted Unit Price
New price	$ 60.00	88.96%	$ 53.38
Growth price	$ 80.00	11.04%	$ 8.83
Unit price			**$ 62.21**

END OFFICE TRUNKS DS0 Level calculated based on blend of new and growth

	Trunk port price	Weight	Weighted Unit Price
New price	$ 90.00	91.31%	$ 82.18
Growth price	$ 120.00	8.69%	$ 10.43
Unit price			**$ 92.61**

GETTING STARTED COSTS - BASE U calculated based on blesed on blend of new and growth

	Base unit price	Weight	Weighted Unit Price
New price	$ 200,000.00	100.00%	$ 200,000.00
Growth price	$ -	0.00%	$ -
Unit price			**$ 200,000.00**

VENDOR 2 - BLENDED PRICES

This sheet blends new and growth prices

ANALOG LINES calculated based on blend of new and growth

	Line price	Weight	Weighted Unit Price
New price	$ 40.00	91.10%	$ 36.44
Growth price	$ 85.00	8.90%	$ 7.57
Unit price			**$ 44.01**

DIGITAL LINES LINES calculated based on blend of new and growth

	Line price	Weight	Weighted Unit Price
New price	$ 55.00	88.96%	$ 48.93
Growth price	$ 70.00	11.04%	$ 7.73
Unit price			**$ 56.66**

END OFFICE TRUNKS DS0 Level calculated based on blend of new and growth

	Trunk port price	Weight	Weighted Unit Price
New price	$ 70.00	91.31%	$ 63.92
Growth price	$ 90.00	8.69%	$ 7.82
Unit price			**$ 71.74**

GETTING STARTED COSTS - BASE UNI calculated based on blesed on blend of new and growth

	Base unit price	Weight	Weighted Unit Price
New price	$ 1,000,000.00	100.00%	$ 1,000,000.00
Growth price	$ -	0.00%	$ -
Unit price			**$ 1,000,000.00**

GETTING STARTED COSTS - BASE UNIT

VENDOR 1

	Weighted Unit Price	Number of Vendor Switches	Total Cost	Quantities of Lines (Digital & Analog) and Trunks (DS0/Line to Trunks Ratio)	**Getting Started Cost - per DS0 (analog, digital & EO trunk)**
Base Unit	**$ 200,000.00**	49	$ 9,800,000.00	5,051,597	**$ 1.94**

VENDOR 2

	Weighted Unit Price	Number of Vendor Switches	Total Cost	Quantities of Lines (Digital & Analog) and Trunks (DS0/Line to Trunks Ratio)	**Getting Started Cost - per DS0 (analog, digital & EO trunk)**
Base Unit	**$ 1,000,000.00**	38	$ 38,000,000.00	3,733,216	**$ 10.18**

Note: The getting started costs in this study are strictly investment related costs. The relate to investments in the fixed components of the switch that are not grown as the switch grows. Not all switch vendor contracts include such getting started investments. In fact, some vendor contracts are as simple as to simply include only the per line prices, so that switch investments are a linear function of the number of lines served (assuming a fixed line-to-trunk ratio.)

PER UNIT PRICES

ANALOG LINES

	Line price	Allocated Base Unit Cost	Unit Investments	Weight	Weighted Unit Price	Fill Factor	Weighted Unit Price
Vendor 1	$ 40.00	$ 1.94	$ 41.94	57.1%	$ 77.60	95.0%	$ 25.23
Vendor 2	$ 85.00	$ 10.18	$ 95.18	42.86%	$ 865.21	95.00%	$ 42.94
Unit price				100.0%	**$ 942.80**	95.0%	**$ 71.75**

DIGITAL LINES LINES

	Line price	Allocated Base Unit Cost	Unit Investments	Weight	Weighted Unit Price	Fill Factor	Weighted Unit Price
Vendor 1	$ 55.00	$ 1.94	$ 56.94	60.00%	$ 106.70	95.00%	$ 35.96
Vendor 2	$ 70.00	$ 10.18	$ 80.18	40.00%	$ 712.52	95.00%	$ 33.76
Unit price				100.0%	**$ 819.22**	95.0%	**$ 73.39**

END OFFICE TRUNKS DS0 Level

	Trunk port price	Allocated Base Unit Cost	Unit Investments	Weight	Weighted Unit Price	Fill Factor	Weighted Unit Price
Vendor 1	$ 70.00	$ 9.70	$ 79.70	57.50%	$ 678.99	97.00%	$ 47.24
Vendor 2	$ 90.00	$ 50.89	$ 140.89	42.50%	$ 4,580.50	97.00%	$ 61.73
Unit price				100.0%	**$ 5,259.49**	97.0%	**$ 112.35**

FEATURE COSTS

VENDOR 1

	Weighted Unit Price	Quantities of Lines (Digital & Analog)	Per line costs	Technology Mix	Vendor 1 feature costs
Software & feature costs	$ 19,000,000.00	2,532,726	$ 7.50		
Per line feature costs	$ 2.50		$ 2.50		
Total			$ 10.00	57.5%	**$ 5.75**

VENDOR 2

	Weighted Unit Price	Quantities of Lines (Digital & Analog)	Per line costs	Technology Mix	Vendor 2 feature costs
Software & feature costs	$ 13,000,000.00	1,871,442	$ 6.95		
Per line feature costs	$ 1.50		$ 1.50		
Total			$ 8.45	42.5%	**$ 3.59**

Per Line Feature Costs

Total (weigjhted sum of vendor 1 and Vendor 2)	$ 9.34
ACF features	0.27
Annual Feature Costs per line	$ 2.52
Monthly Feature Costs per line	**$ 0.21**

END OFFICE PORT COSTS

This tab calculates end-office costs under two scenarios:
1. **Dedicated EO Trunk Port.** Under this scenario, the entire port is dedicated to a particular carrier and so there is no need to calulcate per MOU costs.

2. Common EO Trunk Port. Under this scenario, th eEO trunk port is shared by two or more carriers. Under this scenario, the costs are incurred proportional to usage (see discussion in Comments). As such, the cost are appropriately calculated on a per MOU basis.

I. Dedicated End Office Port Costs

End Office Port Investment	$	112.35	
ACF (377C - Digital Switch)		25.00%	*Note 1*
Annual Costs	$	28.09	
Monthly Costs	**$**	**2.34**	
Shared and Common costs		12%	*Note 1*
EO Port Monthly UNE TELRIC price	**$**	**2.62**	

II. Common End Office Trunk Port Per MOU Costs

Annual Port Costs	$	28.09	
Annual MOUs per DS0		150,333	*Note 2*
	$	0.00019	
Shared and Common costs		12%	*Note 1*
EO Port per MOU UNE TELRIC price	**$**	**0.00021**	

Notes:

1 No further details have been provided since these components do not deal w/ the switching issues in paragraph 81.

2 This number could be calculated, for example, as follows:

27.5 (CCS/BH) * 100 (sec/CCS) / 60 (sec/min) * 10 (BH/Day) * 328 (Equiv. Bus. Days / Year) = 150,333

FLAT-RATED SWITCH PORT, INCLUDING USAGE AND FEATURES

	Unit Inv	Tech Mix	Blended Investment	
Unit Investment Analog Port	$ 71.75	87.2%	$ 62.60	
Unit Investment Digital Port	$ 73.39	12.8%	$ 9.37	
Total Port Investments			**$ 71.96**	
Port Investment			$ 71.96	
ACF (377C - Digital Switch)			25.00%	*Note 1*
Annual Costs			$ 17.94	
Monthly Costs			**$ 1.49**	

Port Costs

Port Costs	$	1.49	
MDF related costs	$	0.05	*Note 1*
Intercepts Required	$	0.01	*Note 2*
Feature costs	$	0.21	
Monthly UNE Line Port Costs (includes port, usage and features)	**$**	**1.77**	
Shared and Common costs		12%	*Note 1*
UNE Flat Switching TELRIC Price	**$**	**1.98**	

Notes:

1 No further details have been provided since these components do not deal w/ the switching issues in paragraph 81.

2 Intercept costs are very small and may be calculated when more detail is available in a manner cosnsistent with the general methodology ilustrated in this cost study